February, 1958 Vol. 47 No. 2

INDUSTRIAL ARTS AND VOCATIONAL EDUCATION

The Shop Teachers' Professional Magazine

The Drawing Instruments Engineers Use and Recommend

Every year thousands of young men reach the point in their schooling where the purchase of a set of drawing instruments is required. When such young men are the sons of technically trained fathers, or when they have the benefit of guidance by any elders in engineering, it is almost certain they will insist on genuine Dietzgen Drawing Instruments. Dietzgen are the drawing instruments engineers use and recommend.

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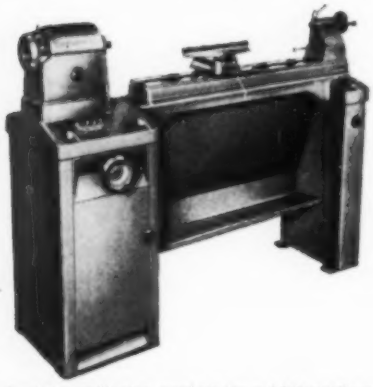
Safety, Versatility and Ruggedness

make Delta choice of Springfield schools



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FEBRUARY
1958

VOL. 47 NO. 2

Industrial Arts and Vocational Education

The Shop Teachers' Professional Magazine

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★ ★ ★

This Month's Cover

The cover picture on this month's magazine depicts a vocational woodworking student, Dennis Barta, at work under the direction of his teacher, Sam J. Sherrill, Tucson High School, Tucson, Ariz.

The photograph is by Karl Kendrick, advanced photo student. Submitted by Harry A. Goldstein, APSA, photography teacher.

★ ★ ★

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Association News

COMING CONVENTIONS

Jan. 25. Utah Vocational Association, at Central Utah Vocational School, Provo, Utah. Secretary, Earl S. Lunt, 7076 South 600 West, Bountiful, Utah.

Feb. 22–25. American Educational Research Association, at St. Louis, Mo. Secretary, Dr. Frank W. Hubbard, 1201 Sixteenth St., N.W., Washington 6, D. C.

Feb. 27–Mar. 1. Illinois Vocational Association, at Jefferson-Sheraton Hotel, St. Louis, Mo. Secretary, Orlin D. Trapp, Township High School, Waukegan, Ill.

Mar. 13–15. New Jersey Vocational and Arts Association, at Hotel Berkeley Carteret, Asbury Park, N. J. Secretary, Jack Shifrin, 72 Madison Ave., Perth Amboy, N. J.

Mar. 14–15. California Industrial Education Association, at LaFayette Hotel, Long Beach, Calif. Secretary, Lee Bodkin, 131 Moore Hall, University of California, Los Angeles 24, Calif.

Mar. 27–28. Alabama Vocational Association, at Birmingham, Ala. Secretary, H. R. Culver, 105 Thach Hall, Auburn, Ala.

Mar. 27–28. Ohio Industrial Arts Association, at Neil House Hotel, Columbus, Ohio. Secretary, C. R. Hawes, 629 Sweitzer St., Greenville, Ohio.

Mar. 27–29. Indiana Industrial Education Association, at Hotel Antlers, Indianapolis, Ind. Secretary, John H. Hinds, High School, Elwood, Ind.

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PRECISION LATHES
A new series of 11" and 13" Precision lathes with . . . toolroom accuracy . . . spindle speeds to 2,000 r.p.m. . . . instant and automatic selection of speeds . . . increased horsepower to spindle . . . and a full range of toolroom and production accessories for greater versatility.
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OKLAHOMA INDUSTRIAL ARTS ASSOCIATION

The Oklahoma Industrial Arts Association held its annual meeting on October 24 and 25, 1957, on the campus of Oklahoma City University.

The State Advisory Committee for Industrial Arts held its annual meeting all day Thursday, with approximately 100 per cent of the 35 members present. The annual banquet and business meeting was held that evening. The guest speaker on this occasion was Dr. Kermit Seefeld, Santa Barbara, Calif. His topic was "Industrial Arts, Yesterday, Today, and Tomorrow."

An Iota Lambda Sigma breakfast was held on Friday, and this was followed by eight sectional meetings, four meetings at one time, giving each teacher a chance to attend two meetings of his choice. These meetings covered the areas of electricity, leathercraft, woodwork, printing, drawing, general metal, photography, and plastics.

A joint meeting of industrial arts and trade and industrial teachers was held after lunch. At this time Dr. Seefeld addressed the group on the topic, "Industrial Education Point of View."

A very fine commercial exhibit of shop equipment and materials was shown in the spacious Automobile Mechanics shop of the industrial arts department.

The two-day convention ended with a Ship's Program.

Officers elected for 1958–59 are: president, Robert A. Hardin, Oklahoma University, Norman; vice-president, W. R. Swarts, Jarman High School, Midwest City; secretary-treasurer, Cary L. Hill, Oklahoma State University, Stillwater; directors, O. R. Moon, High School, Midwest City, Robert K. Phelps, Carnegie High School, and Austin Stockton, Ft. Cobb High School. — *C. L. Hill, secretary-treasurer.*

EPSILON PI TAU MEMBERS

Ten students and four faculty members at State University Teachers College, Oswego, N. Y., have become affiliated with Phi Chapter, Epsilon Pi Tau, industrial arts honorary society. They are: Everett Godfrey, Frank Ingram, Fred Notter, Miss Elizabeth Hunt, David Villeneuve, Robert Babcock, Robert Platt, Harold Loggins, Jack Zyerveld, William King, Frank Torre, Robert Campbell, James Hapeman, and John Shemick.

NEW OFFICERS NAMED

At the November meeting of the Allegheny County Branch of the Industrial Arts Association of Pennsylvania, the following men were elected to office: Ralph Gowetski, president; William Sullivan, vice-president; Robert Colteryahn, secretary-treasurer.

At its regular monthly meeting, December 18, 1957, the New Kensington Senior High School was the site, and a tour through the industrial and vocational shops was conducted. There was a special speaker for the evening, and refreshments were served.

(Continued on page 7A)

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STREAMLINED DESIGN—full 1 HP motor, yet tool weighs just a little under 7 pounds.

MORE ACCURATE — exclusive micrometer-type depth adjustment with calibrated depth dial speeds accurate positioning.

EASIER HANDLING — specially designed handles fit palm of hand. Switch operates without releasing handles.

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Now your students can do beading, grooving, routing, fluting, inlay work—a flock of jobs—faster with the easier-handling new Black & Decker 1 HP Heavy-Duty Router! Here's a maximum of power packed into a minimum of weight—a tool that sets new standards of precision—perfect for fast finishing. And a clearly illustrated manual is included with each tool for project ideas and helpful operation tips.

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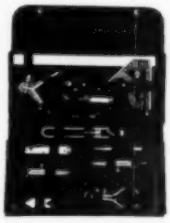
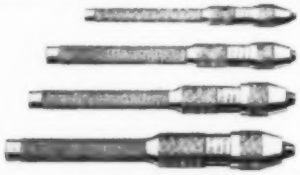
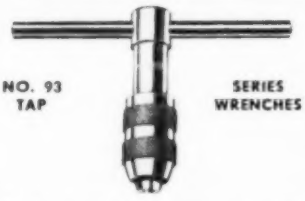


No. 902B shown has 12" combination square, 1" micrometer, center gage, center punch, 6" rule, 4" inside and outside calipers, dividers and hermaphrodite calipers. Many other sets to choose from.



NO. 162 SERIES PIN VISES

Used for holding small stock, wire, taps, files, reamers, scriber points, etc. Sure-grip knurled handles; quick-acting hardened jaws. Set of four has 0 to .187" range.



NO. 93 TAP SERIES WRENCHES

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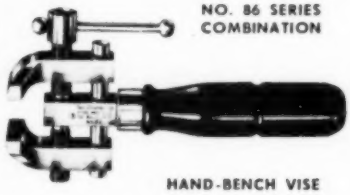

NO. 86 SERIES COMBINATION HAND-BENCH VISE

Available with both handle and clamp for use as a combination hand vise and small bench vise. Jaw capacity, 1½". Length with handle, 7".

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ASSOCIATION NEWS

(Continued from page 4A)

STATE CONVENTION AT BELLINGHAM

The Washington Industrial Arts Association will hold their State convention at Bellingham, Wash., on April 4 and 5, 1958.

The general chairman of this event is Gordon Nichols, teacher of industrial arts at Ferndale, Wash., and he will be assisted by the officers of the Washington Industrial Arts Association — Melvin Kirkland, president, and Clifford Schierer, secretary-treasurer.

The convention theme will be "Industrial Arts in General Education," and the headquarters will be Western Washington College of Education.

NEW ENGLAND INDUSTRIAL ARTS TEACHERS MEET

The Twentieth Annual Convention of the New England Industrial Arts Teachers Association was held in Burlington, Vt., on November 1 and 2, 1957. The theme for this year's convention was "Industrial Arts and the Age of Automation."

Toastmaster J. Warren McClure, president of the Burlington Lake Champlain Chamber of Commerce, and business manager of the Burlington Free Press, introduced Mayor C. Douglas Cairns, and Superintendent of Burlington Schools William T. Logan, Jr.

John P. Walsh, director of the Trade and Industrial Education Branch of the United States Department of Health, Education, and Welfare delivered the banquet address on the theme "Education and Manpower — the Team Approach in Guiding the Development of our Future Manpower." Mr. Walsh called attention to the need of the schools to prepare the student to take his place in a highly mechanized industrial civilization, calling particular attention to the growing need for technical experts.

Officers elected for the year 1957–58 were as follows: president — Michael Russo, Middlebury, Vt.; vice-president — Kenneth Webber, South Portland, Me.; secretary — Edward P. Stach, Bridgeport, Conn.; treasurer — H. Ward Manghue, Newton, Mass. Second vice-presidents and State Chairmen — Massachusetts: Joseph A. Chicetti; New Hampshire: Andrew J. Moynihan; Vermont: Charles Stewart; Rhode Island: Richard P. Anderson; Connecticut: Jack Crowe; Maine: Fred Jackson. Divisional Director of Professional Development: G. Wesley Ketcham, Consultant in Industrial Arts, Connecticut State Department of Education. Divisional Director of Dissemination and Records: George E. Burnham, Westbrook, Me.

It was voted to hold the 1958 convention in Portland, Me.

LOS ANGELES INDUSTRIAL EDUCATION ASSOCIATION

"Do It Yourself" was the theme of the year's second meeting of the Los Angeles County Industrial Education Association, held at West Covina High School, West Covina, Calif., on December 6, 1957.

Following the shop visitations and an excellent meal, the business meeting got under way with several committee reports.

President Stan Ross introduced the guests of the evening, the past deck officers of the Southern Section, California Industrial Education Association.

After the business meeting, Mr. Ross presented Floyd Grainge from Long Beach State College, who proceeded, with the aid of his excellent large diagrams, to explain the evening's project, an a.c., and d.c., circuit tester. The materials needed for the construction of the tester were distributed, and the activities for the evening were concluded when the members present completed their projects. — *R. L. Servis, publicity chairman.*

MEETINGS LISTED AND NEW OFFICERS NAMED

The Fairfield County Industrial Arts Association conducted its first fall meeting on September 25, at Eastern Junior High School, Greenwich, Conn.; and the second meeting of the season was held on November 20 at Bridgeport Machines, Bridgeport, Conn. Future meeting dates for 1958 are: February 13 — Wilton Junior High School, Wilton, Conn.; and April 9 — Johnson Junior High School, Stratford, Conn.

The programs of meetings are organized and carried out by the host group accepting the meeting. Past programs have been enriched by school shop visitations, industrial plant visitations, speakers, panel discussions, exhibition of student skills (workshop), and musical entertainment. The current school year includes plans for a combined dinner meeting of the New Haven and Fairfield County Industrial Arts Associations.

Officers named for 1957–58 are: president — Maurice Lauridsen, Eastern Junior High School, Greenwich; vice-president — John Burkhardt, Stamford High School, Stamford; secretary — Donald E. MacCormack, Johnson Junior High School, Stratford; and treasurer — James Cousins, Sheriden School, Bridgeport. — *Donald E. MacCormack, secretary.*

(Continued on next page)

WHEN LATHES JAM...

look out!

"Educators who specify or influence the purchase of metalworking lathes for school shops know that jamming of a lathe carriage or tool can cause costly gear breakage and flying metal. But students do forget."

"What I didn't know was that only one company—Logan Engineering—makes 12" screw cutting and turret lathes that include a *built-in* automatic safety gear as standard equipment. At the instant of overload, the safety gear disengages, thus guarding against damage in the train of gears from spindle through gear box.

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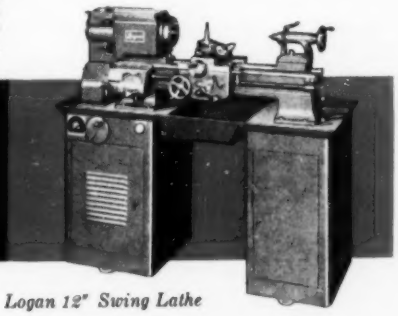
NOTE: Automatic safety gear is standard equipment, too, on Logan 14" screw cutting models (variable speed range, 38 to 1200 rpm), and is optional on all Logan 11", 10" and 9" models.

Look at a *Logan* before you leap



Logan 12" Swing Lathe

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Dept. D-258, 4901 Lawrence Avenue, Chicago 30, Illinois

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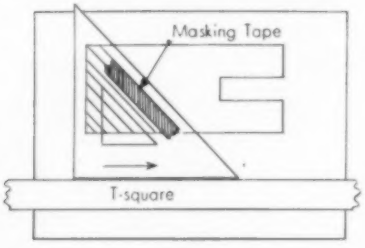
For faster cross-hatching

Here is a simple, fast method for drawing cross-hatched lines with accurate uniform spacing.

Place a piece of draftsman's masking tape on a triangle, so that an edge of the tape is parallel to an edge of the triangle. The distance between the edge of the tape and the edge of the triangle should be the desired distance between the cross-hatched lines.

Begin from the bottom of the cross-hatched section, by sliding the triangle until the edge of the tape coincides with the first cross-hatched line. Draw the next cross-hatched line along the triangle edge. Again slide the triangle until the tape edge coincides with this new line. This procedure is repeated until the entire area is cross-hatched.



Great versatility offered in Big Bow Combination Compass

The POST Big Bow Combination Compass is about as close as you can come to having an "all-purpose" drawing instrument.

You can draw circles from 3/16" of an inch in diameter up to 13 inches in diameter. If you add beam bars you can increase the diameter all the way to 26 inches. For complete flexibility the 890 NBC is equipped with inter-changeable attachments so that it may be used as a divider, or pencil or pen compass. With the addition of a ruling pen handle, the compass pen attachment can be adapted as a ruling pen for straight line ink work. The Big Bow is listed as 890 NBC. It is a precision crafted instrument which combines great versatility with the highest quality.

Post Warranty of performance and workmanship is unique

In addition to unconditionally guaranteeing that all POST instruments are free from faulty workmanship and defective materials, the POST Warranty offers a truly unique plus value. Included with each Warranty is a parts list for each instrument in the set purchased. These parts lists make it easy to replace worn or lost parts. Instructions on how to care for each instrument are also included.

For complete information on the Big Bow 890 NBC or the Post Warranty write the Educational Sales Division, Frederick Post Company, 3648 North Avondale Ave., Chicago 18, Illinois.

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ASSOCIATION NEWS

(Continued from previous page)

NEW OFFICERS ELECTED

The Iowa Industrial Education Association, during their annual convention in Des Moines, Iowa, elected the following officers: president — Merle Wiener, associate professor, industrial arts, Iowa State College, Ames; vice-president — David Cockrum, woodworking instructor, High School, Mason City; secretary-treasurer — Leonard Bengtson, metalworking instructor, Central Junior High School, Ames; new board members — Oran H. Beaty, state supervisor, T. & I. Education, Des Moines; Walter Hayes, drafting instructor, Roosevelt High School, Des Moines; and Dr. Lawrence Wright, assistant professor, industrial arts, Iowa State Teachers College, Cedar Falls.

Board members retained — Frank Everhart, machine shop instructor, Eagle Grove; Owen Shadle, local director of T. & I., Ames; David Tuttle, aircraft and maintenance instructor, Tech High School, Des Moines; and Earl Marihart, immediate past president, IIEA. — *Earl Marihart, Director, Industrial and Adult Education.*

MINNESOTA VOCATIONAL ASSOCIATION

The newly elected officers of the Minnesota Vocational Association are: president — Vernon R. Maack, Central High School, Alexandria; president-elect — Miss Ann Krost, Board of Education Building, Minneapolis; vice-president — Deane Turner, School of Agriculture, Waseca; secretary-treasurer — Mort Carney, Area Vocational School, Austin.

The executive board consists of the four officers of the association, the president, and two additional persons from each affiliated group or organization. Minnesota Vocational Agriculture Instructors Association — Leo Maattala, Odell Barduson, Ed Fier. Minnesota Business Education Association — William Becker, William Knaak, Rita Curtin. Minnesota Home Economics Association — Priscilla Rugg, Lois Miller, Henriette Quilling. Minnesota Industrial Arts Association — Dale Davidson, Fred Rowell, Howard Walton. Minnesota Trade and Industrial Association — Rudy Grunloh, Leon Swedlund, Dan Chamberlin. Consultants — Ex Officio — S. K. Wick, G. R. Cochran, A. E. Keever, Glen Jadwin, John Butler, Robert Worthington, Warren Meyer, Howard Rosenwinkel.

The 1958 convention of the Minnesota Vocational Association will be held October 23 and 24 at the Leamington Hotel, Minneapolis.

WESTERN NEVADA INDUSTRIAL ARTS ASSOCIATION

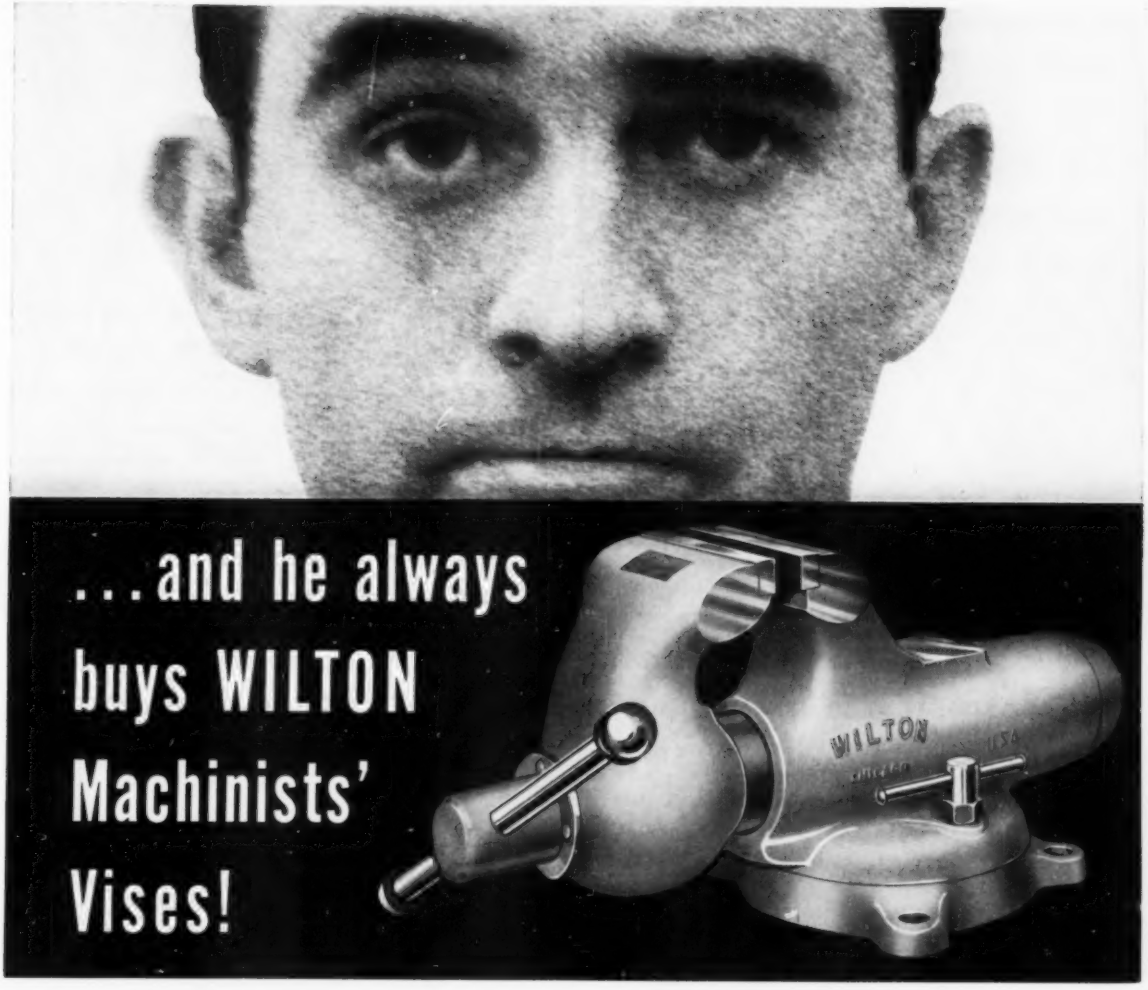
The newly formed Western Nevada Industrial Arts Association held its first general meeting on October 8, 1957, at the State Capitol Building in Carson City, Nev.

Permanent officers elected for the coming year are: president — Al Lerner, Stewart, Nev.; vice-president — Bud Morgan, Reno, Nev.; and secretary-treasurer — Al Ihrig, Reno, Nev.

The second general meeting was held in Stewart, Nev., on December 3. The program was under the auspices of the vocational education department of the Stewart Indian School.

Future meetings will be held at the various schools throughout the state, the purpose being to share new and old ideas with fellow industrial education instructors. — *Al Ihrig, secretary-treasurer.*

"I BUY ON COLD, HARD FACTS!"



For the vocational educator, there's no other way to buy! Equipment failure or malfunction is too expensive, in lost teaching time and in dollars and cents, to risk "guesswork buying." This is why most vocational educators prefer Wilton. According to actual comparative specification sheets, now available, the cold facts are that Wilton vises are made better, work better, cost no more, and are backed by the strongest vise guarantee ever offered – *Wilton's unconditional five year guarantee!*

Wilton Vises Are Sold By Leading Distributors Everywhere

WRITE FOR NEW FREE CATALOG!

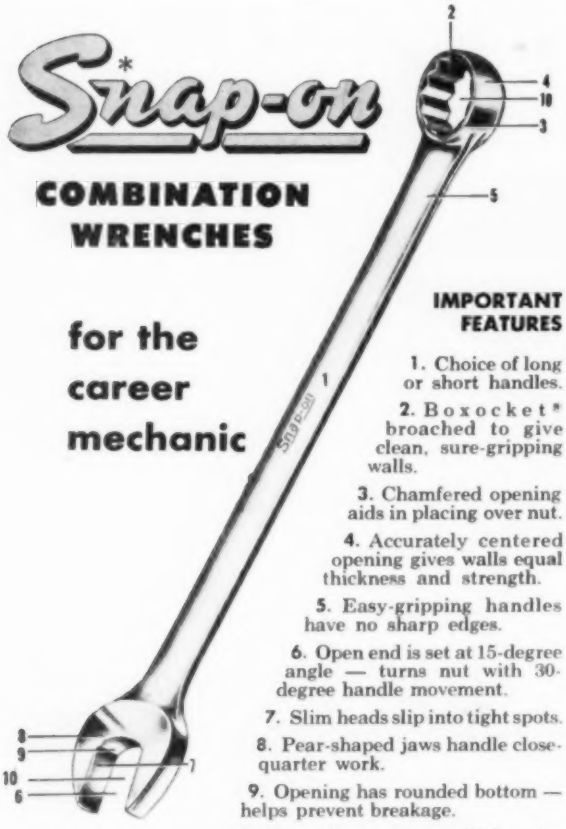
IAVE 2

WILTON TOOL MFG. CO., INC.
SCHILLER PARK, ILLINOIS

*Snap-on

COMBINATION WRENCHES

for the career mechanic



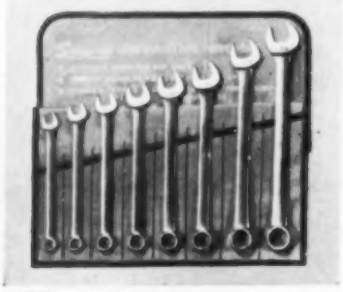
IMPORTANT FEATURES

1. Choice of long or short handles.
2. Boxocket* broached to give clean, sure-gripping walls.
3. Chamfered opening aids in placing over nut.
4. Accurately centered opening gives walls equal thickness and strength.
5. Easy-gripping handles have no sharp edges.
6. Open end is set at 15-degree angle — turns nut with 30-degree handle movement.
7. Slim heads slip into tight spots.
8. Pear-shaped jaws handle close-quarter work.
9. Opening has rounded bottom — helps prevent breakage.
10. Same size opening at both ends.

3 POPULAR SETS • OTHER SETS AVAILABLE

◀ **Angled-clearance offset** — 6-wrench set from 5/16 to 5/8-in. openings. Also individually.

Close-quarter short handle — handy 8-wrench set from 5/16 to 3/4-in. openings. Also individually. ▶



◀ **High-leverage long handle** — 8-wrench set—sizes from 7/16 to 7/8-in. openings. Also 12, 15 and 18-wrench sets or individually.

Call your local Snap-on branch for additional information on Snap-on Tools for Schools. Ask for helpful Snap-on wall charts.

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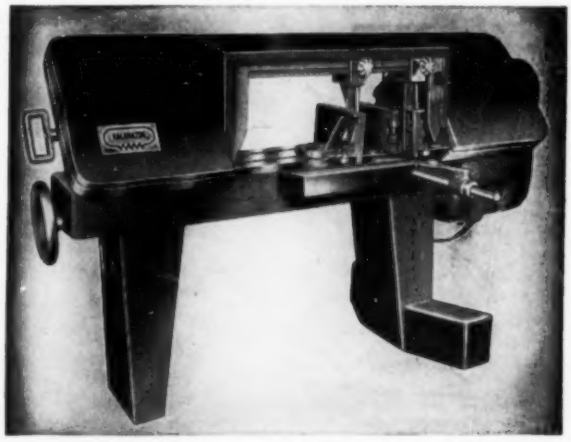

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CUTS 8" ROUND, 16" FLAT STOCK, 8" PIPE

Good tools make teaching good workmanship easier. That's why most leading schools use *Kalamazoo* Metal Cutting Band Saws. Specify *Kalamazoo* for accuracy and safety. Four models, available with casters and coolant. Get full details *now*.

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"Jorgensen" TRADE MARK REG U S PAT OFF and "Pony" REG U. S. PAT. OFF.

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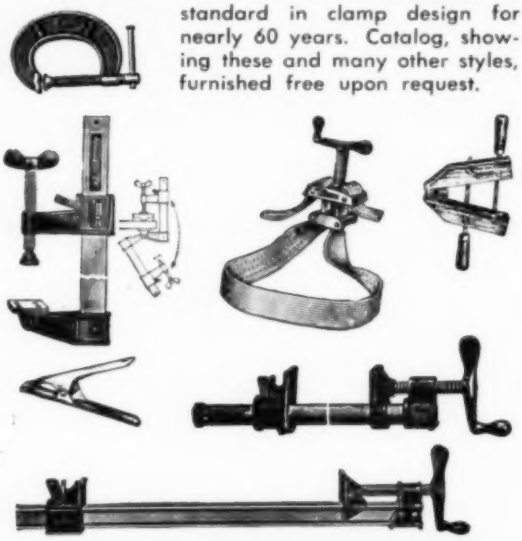
Manufactured by specialists who have set the standard in clamp design for nearly 60 years. Catalog, showing these and many other styles, furnished free upon request.



the clamp folks

ADJUSTABLE CLAMP CO.

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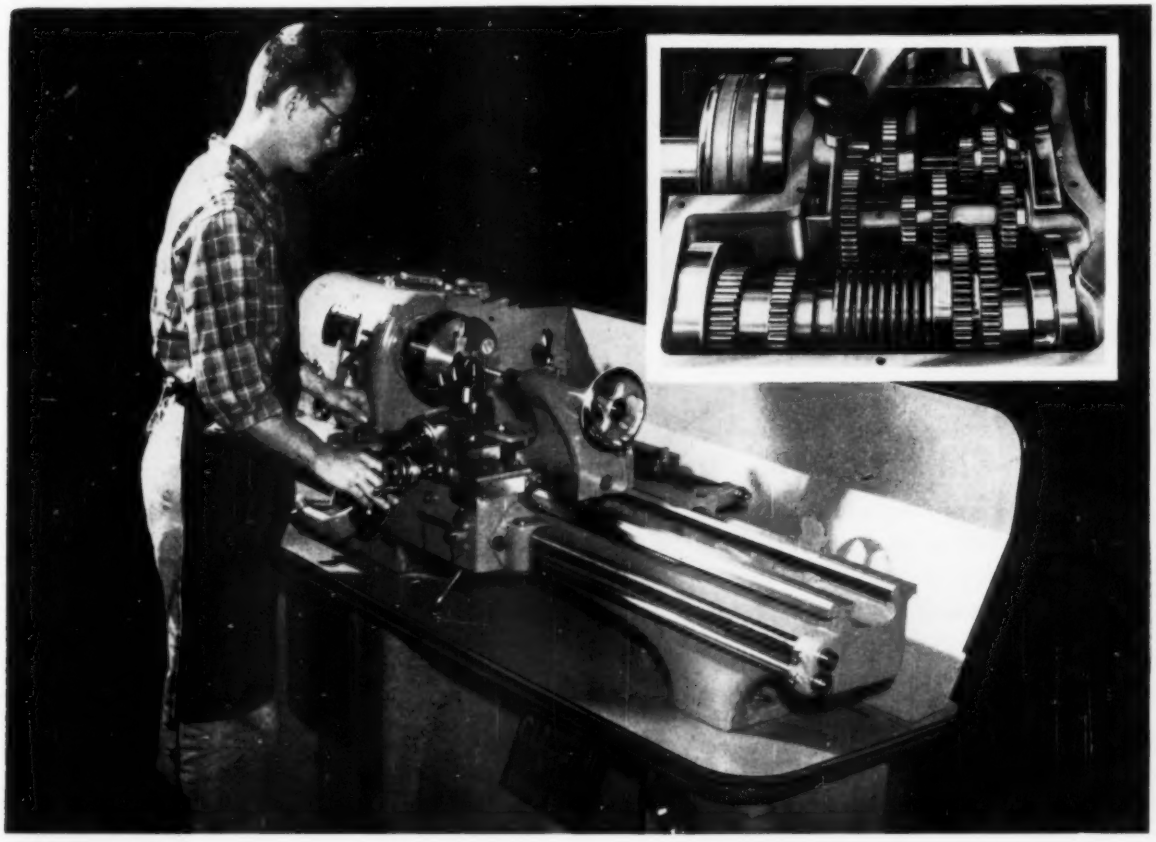


NOW– A Geared-head Lathe Priced Within School Budgets

The NEW COLCHESTER CLAUSING 13" LATHE

If you've wished for a geared-head lathe priced within your budget, here's your dream come true — *the new Clausing 13" geared-head lathe.*

And what a lathe it is! Look at the massive one-piece bed with its hardened and ground ways. Spindle and bearings, too, are larger—and bearings are the most efficient and accurate known to industry, Gamet Micron tapered roller bearings with oil flow lubrication. Gears are shaved, heat-treated, high-tensile steel — gears and shafts in head, and quick-change box turn in bath of oil. Apron is double-walled.

And for safety of student, and safety of operation:

- **locking cabinet drawers isolates electrical controls, prevents unauthorized use of machine**
- **removing gear guard locks out electrical controls**
- **starting lever has friction brake that stops lathe instantly**
- **tapered spindle nose prevents chuck run-off on braking or reversing**
- **separate rod for power feed, lead screw used for threading only — cannot be engaged simultaneously**
- **lead screw and gear train protected by shear pin, feed rod and gear train by safety clutch**
- **totally enclosed headstock and quick-change gear box**
- **heavy steel cabinet has drawers for tool storage, full length chip guard at rear**

The new Clausing is available in 24" and 36" centers with straight or gap bed. Write for complete details and prices — you'll be amazed at the values!

CLAUSING DIVISION • ATLAS PRESS COMPANY
2-121 N. Pitcher Street • Kalamazoo, Michigan

Personal News

DR. WILLIAM F. RASCHE HONORED

Dr. William F. Rasche, director of the Milwaukee Vocational and Adult Schools, was named the recipient of the Milwaukee Junior Chamber of Commerce Good Government Award at a noon luncheon on December 4, 1957.

A goodly number attended this luncheon. Among them were the following: Mayor Frank Zeidler; Dr. E. R. Krumbiegel, City Health Commissioner; Harold S. Vincent, Milwaukee Superintendent of Schools; District Judge Frank E. Gregorski; Alderman James Mortier; Mrs. Elizabeth Holmes, member of the Milwaukee County Board of Supervisors; Walter F. Hintz, Milwaukee County Board of Supervisors; Les Brann, Association of Commerce; O. A. Jirikowic, Federated Trades Council; and Rev. Herbert Berner, Mt. Olive Lutheran Church.

In his response, Dr. Rasche cited the role of vocational education in relation to the new challenges of scientific development. He also recounted his experiences which he amassed in education through the 50 years of his strenuous efforts in this field.

He specifically announced that he would retire next June. The compulsory retirement law which makes this necessary robs Milwaukee of a director of its vocational school who has done more for Milwaukee's youth and for vocational education than most people know.

Dr. William F. Rasche

At present Dr. Rasche is accomplishing several energetic men's jobs in the civic life of Milwaukee and he is determined to finish the annex addition before he retires.

He is chairman of the Metropolitan Youth Commission; secretary of the Metropolitan Milwaukee War Memorial, Inc., and a member of the board of directors of the Urban League.

He was president of the Town Hall, 1945–47; president of the Christian Center, 1944–47; president of the Civic Alliance, 1942–43; president of the Round Table, 1940; a life member of the American Vocational Association; and a member of the National Education Association, the Engineer's Society, Phi Delta Kappa, the Wisconsin Education Association, the National Association of Secondary School Principals, the Wisconsin Association of Vocational and Adult Education, and the Industrial Relations Association.

From 1943 to 1945 he was chairman of the Technical Committee on classification for the metropolitan Milwaukee area.

JOHN J. SEIDEL, EDUCATOR, DIES

Dr. John J. Seidel, assistant state superintendent of schools for vocational education in Maryland, died suddenly at his home in Baltimore on October 30, 1957. He was 63.

A life member of the American Vocational Association, he served the association as president in 1942.

Dr. Seidel was nationally and internationally known as an authority on vocational education. From early in his career he was regularly called upon as a leader or adviser in various projects or organizations of national scope.

Born in Baltimore, he was graduated from the city's Polytechnic Institute in 1913; earned his B.S. at Teacher's College, Columbia University; and his Ph.D. in education at the University of Maryland.

Before World War I he was for a time an assistant superintendent of the forge shop at Bethlehem Steel Company. During the war he became an Army flying cadet at the School of Military Aeronautics in Princeton, N. J. He entered teaching at the Fullerton High School, Baltimore County, where he later served as principal — in 1921.

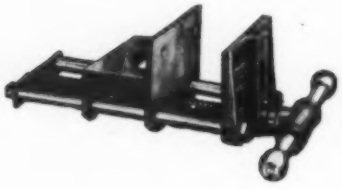
Promoted to County Supervisor of Voca-

(Continued on page 20A)

To Be Absolutely Sure, Specify

MORGAN VISES

backed by sixty-five years of engineering and manufacturing skill that allows an UNCONDITIONAL GUARANTEE on your choice of rigidly inspected and strict-quality-controlled woodworking vises.



solid nut continuous screw vise

semi-steel castings
cold rolled screw
solid nut
cold rolled side bars
machined to close tolerances

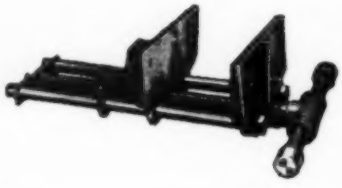
four handles available:
tubular steel,
aluminum, wood,
or adjustable steel with stop in front jaw

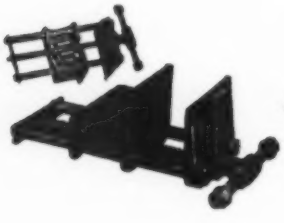
semi-steel castings
accurately machined
tubular steel handle

cold rolled screw with
intersecting threads
operates on a half nut

twist-of-the-wrist
disengages, engages work quickly

quick action vise





18A dual purpose vise

semi-steel castings
close tolerance machining

continuous buttress thread
screw cut from heavy rolled stock

floating nut gives rapid,
smoother screw action

adjustable stop in front jaw

new development combines
speed of rapid action with
smoothness of continuous screw vise

ALL MORGAN WOODWORKING VISES FIT FLUSH ON 2¼" BENCHTOP.
ALSO AVAILABLE: junior woodworker, machinist, homecraft and utility vises.

WRITE for complete catalog of **MORGAN VISES,** the vises that make you absolutely sure of your choice.

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OLIVER 18-in. Planer is unmatched for surfacing small stock

This sturdy Oliver Surfacer has one-piece base that assures permanent alignment of parts. Heavy ball bearing cylinder has three high-speed knives. Power driven feed rolls — 15′ to 35′ a minute. Takes stock up to 18″ wide, 6″ thick, as short as 8½″ when fed singly. Turns out exceptionally smooth work. Write for Bulletin No. 399.

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A WINNING PAIR!

BOICE CRANE MONOMASTER 10-INCH TILT ARBOR SAW

New trunnion carries larger motors — to 2 H.P. Cuts 3¼″ hardwood like butter! Fast SINGLE blade positioning control. Train of parts, trunnion to arbor, assembly-locked into one rigid part for a new high in precision.

Up to 44% more ripping capacity, and 29% faster blade speed. Three power-packed V-belts. Accident-proof start-stop switch. Blade tilts left — adds safety for right-handed operators. New insert serves saw blades *and* dado heads, *without* interchange.

BOICE-CRANE 6-INCH ALL-STEEL LONG TABLE JOINTER

5-foot steel tables and 4-foot 2-lock fence. Does better work, with less effort or skill. Planes 12″ wide. (8″ model has 84″ tables, 66″ long fence.)

Wider infeed table makes rabbetting as easy and safe as jointing. Guard stays on machine — simply swings down. More accurate knife setting. Improved knife angle for beautiful blemish-free finish. Depth of cut, ⅛″.

NEW LOW PRICE on 6-inch model — $199.50 less stand and motor.

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for accurate shopwork

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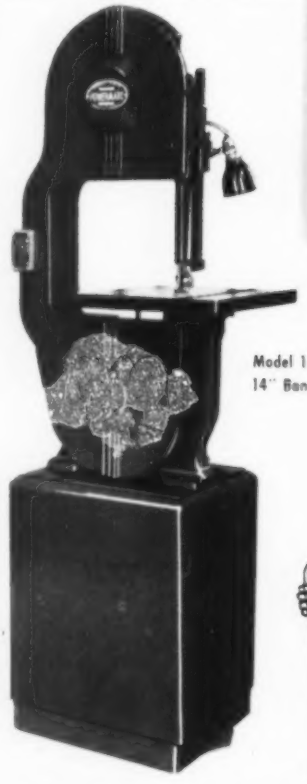
GREENLEE 22 SOLID-CENTER AUGER BITS bore *accurate* holes smoothly, quickly. Solid-center design gives extra strength and provides fast, positive chip clearance. Every GREENLEE 22 Auger Bit has accurately sized, perfect cutting edges that last through long use. "Plastic Sealed" to reach you factory-sharp. Available in 18 sizes: from 4/16″ diameter through 2 4/16″. Buy singly or in sets . . . in handy plastic rolls, steel boxes, or metal holding panels.

CHISELS, GOUGES Various types of tang butt, socket butt and firmer chisels. All are carefully balanced, easy to hold. Blades are of selected tool steel that long retains its fine-cutting edge. Green plastic handle provides comfortable, sure grip. Buy singly or in sets. GREENLEE socket gouges available with inside and outside bevels . . . same top quality as all GREENLEE tools.

TOOLS FOR CRAFTSMEN
GREENLEE

The GREENLEE tool line also includes expansive bits, electric drill bits, turning tools, drawknives, and many more. Write for literature. Greenlee Tool Co., 2022 Twelfth St., Rockford, Ill.



new!

WOOD CUTTING

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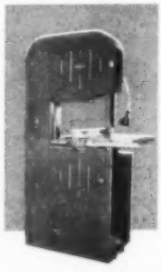
Model 140
14" Band Saw

SMOOTH CUTTING ACCURACY

Here's where low investment and high quality *really* meet. Extra large table, rugged construction and precision workmanship make this Powermatic unit extremely practical for a wide range of shop and plant requirements. Get full details on this exceptional new Powermatic 14" Band Saw *today!*

- RUGGED, RIGID CAST-IRON FRAME FOR VIBRATION-FREE OPERATION
- 16 x 16" TABLE ON HEAVY TRUNIONS. TILTS 45° RIGHT, 10° LEFT.
- FINEST GREY-IRON WHEELS, DYNAMICALLY BALANCED. LUBRICATED-FOR-LIFE BALL BEARINGS



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New IRWIN Bit
lets you dial your size

Now bore 35 standard hole sizes with just one tool

Here is the new Irwin wood boring tool that does the work of a whole box full of individual sizes. And it costs much less, too. Just the easy turn of Irwin's patented Micro-Dial and it's set to go! No hunting, no fumbling for the size you need. No slow down of School Shop work. Clean, fast, accurate boring action in any wood. Fits all hand bit braces.

And the new Irwin Micro-Dial is built to deliver the longest possible service in your shop. It's drop-forged from special bit steel, heat treated full length, precision machined for accuracy and sharpness. Highly polished, too. Two cutters supplied with each bit. Replacement cutters also available. Put the Irwin Micro-Dial Expansive Bit on your requisition list today. No. 21 bores $\frac{5}{8}$" to $1\frac{3}{4}$" and No. 22 bores $\frac{7}{8}$" to 3".

No. 2 Lockhead Expansive Bit. Bores 35 standard holes, $\frac{7}{8}$" to 3". Solid clamping device holds blade securely. Also available in No. 1 size which bores $\frac{5}{8}$" to $1\frac{1}{2}$". only **$3.45** $\frac{7}{8}$" to 3" size

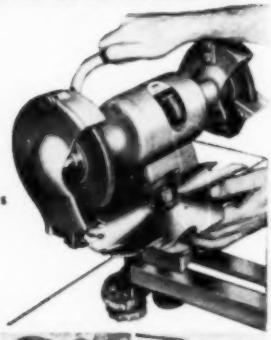
No. 22 Micro-Dial only $3.80 $\frac{7}{8}$" to 3" boring range

IRWIN Wilmington, Ohio

the original solid center auger bit
•
screw drivers — screw driver bits

KEEP SHARP

with the new
FOLEY GRINDER



SHARPENS:

- All rip, cross-cut and combination circular saws 5" to 44" in diameter
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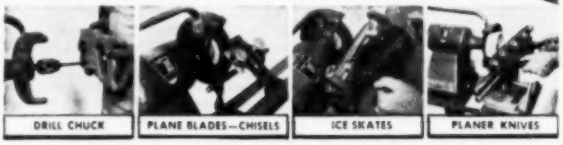

You'll wonder how you ever got along without it, once you have the new Foley 314 Grinder in your shop. This versatile, high quality, low cost grinder does a beautiful job on all types of circular saws and dado heads—also has handy attachments for practically all sharp edged tools. It's a marvel for operating ease and speed, capacity and precision work—compares favorably with grinders costing two to three times as much. Meets safety standards. Fully guaranteed for one year. Write today for full information and prices on Foley 314 Grinder and attachments.

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Send full information on Foley 314 Grinder.

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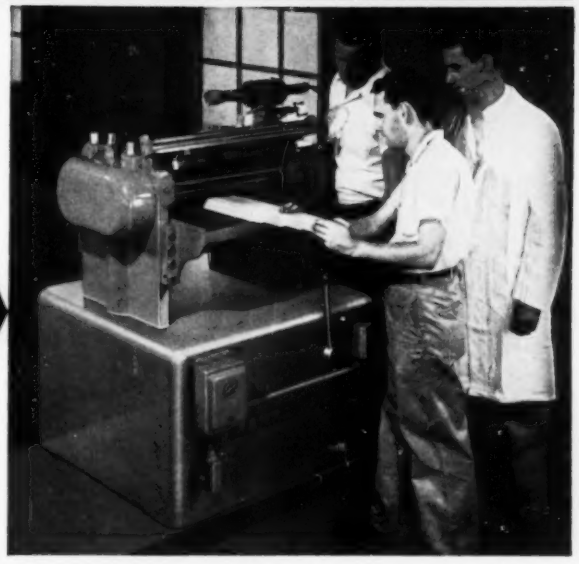
Students learning on Parks Planers benefit not only from the safe, easy, and accurate operation of these planers, but also from the practical experience of working on the same type of high-speed, precision built planers they will eventually use in their trade. The Parks No. 20, 20" Planer (at right) has a 4-knife cutter-head with a speed of 3600 R. P. M. and offers two feed speeds—20 and 40 F. P. M. or 40 and 80 F. P. M. Available with knife-grinding attachment at additional cost.

THE **PARKS** No. 20
20" Thickness PLANER
WITH KNIFE-GRINDING ATTACHMENT



THE **PARKS** HEAVY-DUTY
12" Thickness PLANER

At left is the Parks Heavy-Duty 12" x 4" Planer—a compact, sturdy thickness planer with feed speed of 16 F. P. M. at 4000 R. P. M. Will handle material as short as 6" and as thin as ¼". Both planers are priced low enough for even the most modest shop budget. WRITE FOR COMPLETE DESCRIPTIVE LITERATURE.

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91 RZ 751 KNIGHT Recorder, only $94.95

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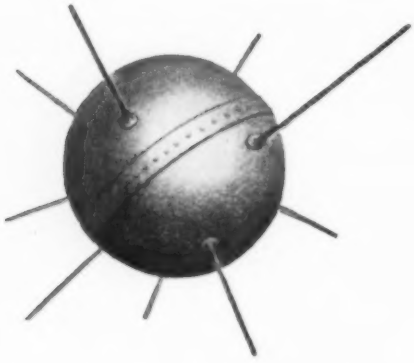

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Rated Capacity: 3/16 flange on 22 gage mild steel, full brake length. Fingers of case hardened steel in widths of 2, 3 and 4 inches permit 3 inch box and pan depth. Other Prices of the Bench Series

4 ft. Universal,	$220.00
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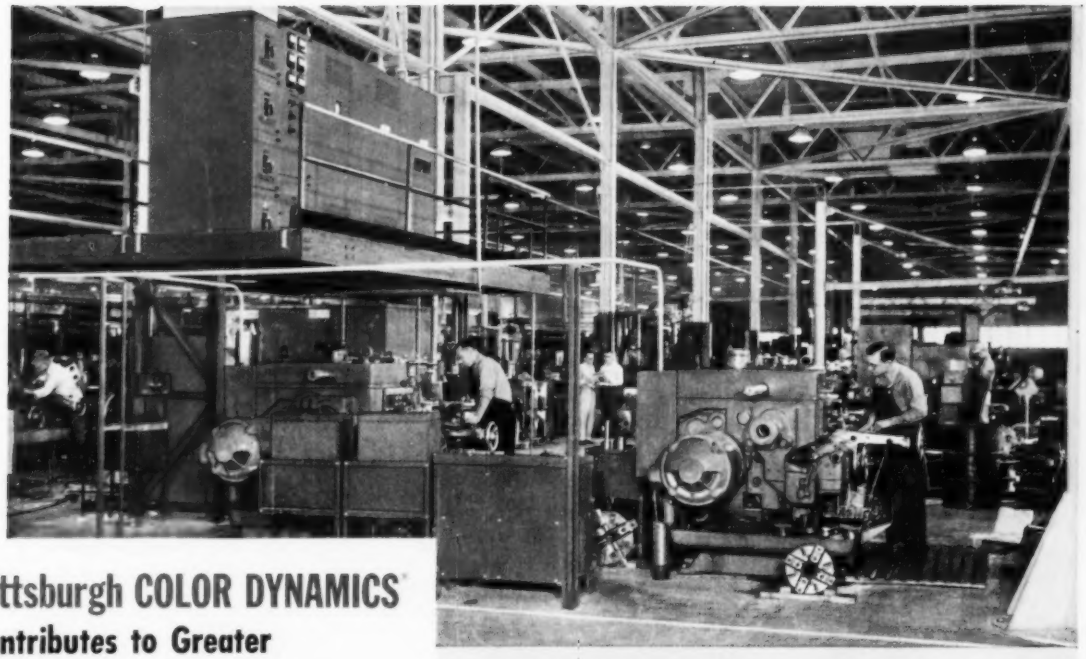

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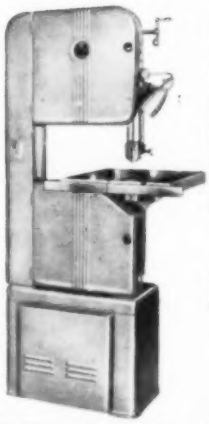

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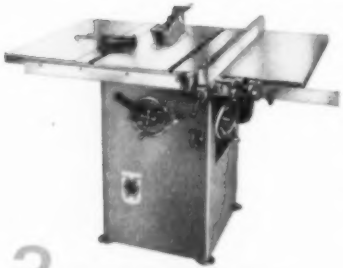

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Industrial Arts and Vocational Education
The Shop Teachers' Professional Magazine
FEBRUARY 1958

Industrial Arts Teacher Education in 1970

WILLIAM J. MICHEELS
Professor and Chairman
Industrial Education
University of Minnesota
Minneapolis, Minn.

Two brief stories are necessary to set the stage for this article. The first, from an old favorite, Alice in Wonderland. In this instance the cat had just finished telling Alice that in going in either direction she would run into mad people.

"But I don't want to go among mad people," Alice remarked.

"Oh, you can't help that," said the cat: "We're all mad here. I'm mad. You're mad."

"How do you know I'm mad?" said Alice.

"You must be," said the cat, "or you wouldn't have come here."

During the past several weeks I wondered many times about the state of my mental health for attempting this article.

The second part of this piece of writing has its setting in a young man who was visiting Washington, D. C., for the first time. He was riding in a taxicab down Pennsylvania Avenue. As they came to the Archives Building, traffic forced them to stop for a moment. One of the inscriptions outside the building caught the young man's eye: "What is past is prologue." He tapped the driver on the shoulder and said, "Say, what does that mean?" The taximan hardly hesitated. "Son," he said, "it simply means you ain't seen nothin' yet."

Most of us are becoming painfully conscious of the fact that we ain't seen nothin' yet. Already things are happening so fast that it is difficult to get a clear picture of what is going on. It is folly to think about a complete set of blueprints. We will have to be satisfied with some quick, simple sketches and that is what I have attempted, crude as they may be. You can add your own details and finishing touches.

In 1970 industrial arts teacher education will be carried on in a world that is significantly different from what we know today. What made sense in the past, or even today, is not likely to make much sense in 1970. This raises the challenge of thinking in completely new terms about what needs to be done. That is not easy. In fact, it poses our greatest problem — the personal problem of readying our mental set to think creatively and act creatively.

If you will permit the analogy, our educational program, in industrial arts as well as elsewhere, might be likened to a teacher and his students in an automobile, backing down the road at a very slow pace. The headlights shine brightly on where they have come from. It is easy to see the rough spots, the bumps, and most of the rocks in the road of the past.

Two dim red taillights are the only aids pointed toward the future. They indicate danger, but they do a poor job of illuminating the path to be followed. For this reason the teacher feels it necessary to keep his hand firmly on the wheel, never allowing his students to steer or get out of the car and explore the sides of the road. He finds security in having the students concentrate on the rocks and contours that stretch out behind.

But now and then our teacher casts nervous glances into the rear-view mirror. He can't see much but he senses danger. And that's where we come in. We aren't much better off than the teacher, but we must help him turn the car around, even if the space is narrow. The road ahead is treacherous. The car is bound to get into the ditch unless we get it turned around with the bright lights shining on what lies ahead.

The tools we need to turn the car around are the tools of new thinking, creative thinking, bold thinking. If we haven't these tools in our kit, or if we are not good enough mechanics to improvise them, we will have to content ourselves with thoughts of backing down the road to oblivion.

I for one, however, have complete

faith in our ability to get the car turned around. And not only will we get the lights shining into the future but we will be making some adjustments and tune-ups so that our speed and performance are significantly better than they were before.

One of the first things we see on the road of the future is the educational threat of a revitalized China alongside a Russia that has gone education mad.

The Chinese giant, 600 million strong, has awakened. This may well pose the biggest problem we have ever met in this country. Out of chaos they have brought order, discipline, and conformity. They hope to match our industrial production in another generation. I read a recent report on the "frightful miracle" that has been accomplished in China in the past seven years. We may rightfully condemn their ideology, but it is folly to hide our heads in the sands of complacency.

What has begun to happen in China has been going on for a longer time in Russia. It started generations before that in the United States. The ironic fact is that these two Communist countries have grasped the idea that made our country great and are adapting it for their sordid purposes. What is the basic idea? Simply this, educating all the children of all the people. They have realized the potential inherent in such a concept and are getting at the task with a vengeance. In short, they are preparing a vast army of technicians and workers who will be able to meet us head on in the emerging battle of brains.

In the immediate years ahead, not 1970, our industrial-arts teacher education programs will have to reflect a cognizance of this fact, if we are to do our part. We will require teachers who are aware of what is going on in the world about them — teachers who are able to help young people understand the part that tools and materials will play in this vital struggle.

In passing it should also be mentioned that many underdeveloped countries are just beginning to realize the possibilities of having their citizens learn to work with tools and materials as a part of their general educational training. Industrial arts will be moving around the world. By 1970 we can expect many more foreign visitors and students in our teacher-education programs.

These few paragraphs have done little more than mention the problem, but any attempt to look ahead must take account of the world in which we will be living or the view will be myopic.

Back on the home front one of the inevitable problems will be that of sheer numbers. This requires no guesswork. The children who will be 1970's college students are already born. In 1955 the number was 2,720,000. The 1970 U. S. Office of Education figure is 6,400,000, more than double. How will we handle twice as many students?

It seems obvious that by 1970 we will have learned to make some radical departures with respect to class and laboratory size. We will have found ways to handle much larger groups effectively. Among the approaches to be explored are much more independent study, much better instructional materials, more effective individual counseling, much more independent laboratory work and practice, larger class demonstrations, more small class or group discussions, and more effective use of motion pictures and television.

Someone has written that instead of Mark Hopkins on one end of a log and a student on the other, we will soon be having a professor at one end of a coaxial cable and 5000 students at the other. The ratio may be somewhat less for industrial-arts teachers but the implications are the same. Many of us continue to think that we can handle only as many students as we have work stations. I would like to continue thinking the same way — it is easy — but it is just as easy to see that such thinking will not provide the answer.

The challenge is a real one, but not insurmountable. In being forced to explore we will likely find various answers. In the process we must learn how to improve the quality of our product for that is just as necessary. The industrial-arts teacher of 1970 is going to have to be much better prepared than the teachers coming from our departments in 1957. This is another obvious deduction when we stop to consider the evolving nature of our subject matter.

During the next 15 years our offerings will have to include a tremendous array of new plastics, ceramics, lubricants, alloys, and various chemical substances that as yet have no name. In some of our laboratories students will be experimenting with solar energy. By then we will have direct conversion of atomic energy into electrical energy and one wonders how this will be reflected in our shop and laboratory courses.

Experimenting with the concepts of miniaturization will be commonplace. The subject of hydraulics will receive much more attention. Electronic computors, or some of their offsprings, will find their way into the industrial-arts laboratory for such things as testing materials, maintaining inventories, dispensing lesson materials, and even giving tests. New gadgets, new materials, new processes will be popping up with such rapidity that we will be hard put to separate the real from the trivia. This leads to the natural question of asking what kind of a creature must we prepare to handle such a teaching assignment?

I am not able to answer this question in terms of specifics but it seems obvious that we will have to get at the task of developing more meaningful descriptions of the kinds of behavior we expect an industrial-arts teacher to exhibit. Today's typical freshman in our programs has little more than a vague and nebulous faith that he will learn a lot of skills and that somehow his four years of training will give him the wherewithal to become a successful teacher. I see the time when each teacher-learner will be provided with a descriptive inventory of the competencies he ought to develop during his years of training.

Such an inventory, creatively developed (and the word creatively needs to be stressed), can serve as a useful check list of skills, understandings, and even attitudes toward which the young teacher ought to be striving. I am not thinking of a panacea but rather of a practical tool in the form of a comprehensive learning guide which the young teacher can use to chart his learning activities and check on his progress.

By 1970 we will see much more independent study in our colleges and some kind of improved learning guides will be an absolute necessity. As President Taylor of Sarah Lawrence College has remarked, "We will be forced to give the colleges back to the students."

This will come about because of the mass of people on our campuses, and it will be a good thing. We will have to dispense with our huge mechanical machine for disseminating knowledge, a machine in the form of professors, which operates in only one dimension, the dimension of memory. By requiring our students, through necessity, to assume more and more of the responsibility for learning, they will be forcing us to make the learning more functional and practical.

Many questions are being raised about our present system of lectures, textbooks, standard subject matter requirements, typical examinations, and numerical grades. Even in a jet-powered world I cannot see these educational traditions changing in a hurry, but by 1970 there will be some very noticeable dents in the armor of these long established practices. The trend, as I see it and hope for it, will be a gradual shift in emphasis from what is being taught to what is being learned.

This suggests that more teaching responsibility should be assigned to our students beginning with the first day they are in our college classes. By 1970

I hope we will have learned how to make every college class a real methods class. This has been an area of sterility in too many of our teacher education programs. Every shop and laboratory class *is* a methods class, in the sense of the timeworn phrase that we teach as we were taught. But how many shop teachers give emphasis to this inherent part of their work.

In a similar vein, we ought to be doing some experimenting with the concept implied by the phrase, each one teach one.

What I am trying to suggest is that we do a better job of making our students actively aware of their positions as future teachers. The next few years will witness a variety of experiments aimed in this general direction. One such study, about to get under way, will bring high school graduates into the high school program as teacher trainees. Their college education will be subsidized. In essence, this is an adaptation of the apprenticeship idea, but it projects the trainees into a teaching environment immediately.

Back to the movement for more independent study. As this gains momentum we will be learning how to do a better job of utilizing peer evaluations. This will be a natural outgrowth of the demand for more and more self-direction on the part of the learners. As this trend gains stature I can envision students serving as examining committees to evaluate the skills and knowledges, as well as the attitudes of their fellow students. They already do this as a natural part of working in groups, but the process is informal and unorganized. We should learn how to exploit this potential and make such evaluations an integral part of the teaching-learning process. This does not imply taking the final evaluation out of the hands of the instructor. Rather, it is a means for providing him with much more useful information to make the final evaluation.

As we learn how to assign more and more responsibility for independent study, as we develop more meaningful descriptions of the competencies our students ought to be developing, and as we learn how to utilize the benefits of effective peer evaluations, I foresee a product much better grounded in the fundamentals of our disciplines — better craftsmen in working with the tools, materials, and ideas that constitute the subject matter of industrial arts. This will happen because the necessary motivation that triggers the process will come from within rather than be imposed on the students from the outside.

A natural development will be the inclusion of more problem-solving activities in the learning process as opposed to the rote learning which permeates so many courses. One of our jobs will be to provide more experimental and simple research activities having to do with the use of tools and materials in solving problems. A major breakthrough, already building up, will have occurred in this matter of design, with all that term implies. Our teachers of 1970 will have learned to treat design as a form of problem solving, a product of research, a way of feeling, rather than a series of mechanical rules for contour development and surface enrichment.

As such developments are tied into skyrocketing enrollments it seems apparent that many of us will be forced to experiment with different shop and laboratory time arrangements. Students may spend a half-day or all day in a laboratory rather than the typical one or two-hour session. We ought to get some facts about the pros and cons of spending full time in the shop with concentrated experiences over a relatively short period of time.

Some of our departments may be forced to operate around the clock before 1970 is here. Other departments will be experimenting with co-operative work experience programs; still others may be requiring summer work in industry as a planned part of the curriculum. Many of our students do these things now in order to stay in school. We have done a lot of talking, but to this point we have not been very creative in exploiting the natural relationship that exists between our departments and the industries of the community and state.

The sheer force of numbers will make us do some creative thinking about our student teaching or cadet teaching. In line with the thought of placing more teaching responsibility on our students from the first day on we may find them spending time in a secondary school shop much earlier in the training program. Some students might even receive a part of their subject matter training in such an environment, while serving as a teacher's aid. What would be wrong in giving credit in woodworking, or any other subject, for work in a secondary school shop under the direction of a master teacher? This idea ought to receive a lot of thought because I think it is another potential waiting to be exploited. Actually it is another adaptation of the internship or apprenticeship idea which we ought to explore from various vantage points.

Many of the thoughts already expressed will become feasible because by 1970 we will have had a real breakthrough in teaching materials. The trend is under way even now. The wide variety and wealth of instructional material coming from industry will be tailored in better fashion to meet the needs of our teachers in training. The textbooks of 1970 will better meet the criteria of real learning guides to aid the students in their individual development. We will still have, and need, our "cookbooks" and encyclopedias of facts, but we will have learned how to do a better job of providing textual materials that pose practical problems, aid motivation, and guide the student along the road to real learning.

By 1970 we should have instructional materials for getting at a sadly neglected area in our teacher education programs. I am thinking of the poor job we do in helping our teachers to understand and appreciate the profound significance of tools and materials in the historical development of our culture. I am happy to report a start in this direction. The scholarly study of Dr. Gerhardt Neubauer of the University of Florida on the Significance of Wood Technology for Western Culture may well be a landmark in bringing our field along the road toward maturity. As we have similar studies in other areas we will be gaining a wealth of resource materials which will add stature, meaning, and importance to our field. The next job will be to adapt and utilize these materials in our colleges and secondary schools.

At least passing mention should be made of the obvious fact that our 1970 curricula will contain much more science and mathematics. I hope that our college instructors will have learned by then how to make these important subjects live for our students in terms of more direct applications for the teaching of industrial arts. Part of that responsibility will rest with our own shop teachers. I would like to see, at the college level, some immediate experiments wherein industrial arts serves as a core subject around which the other disciplines are introduced. Some of our writers have mentioned the desirability of industrial arts as a core subject in the junior or senior high school. We should not speak too loudly until we train some teachers who can handle such an assignment.

In this same connection, 1970 will see us turning out industrial arts teachers who can direct secondary school programs which might be called, for want of a better name, vocational-technical orientation or applied technology. In such a program the industrial arts teacher will be working hand in glove with the mathematics teacher and the science teacher, as well as other teachers in the school. The industrial arts shop will be the focal point for giving life to the several disciplines by providing opportunities for direct ap-

plication of subject matter in problem-solving situations. Our challenge will be to turn out broadly trained teachers who are real craftsmen having a sympathetic understanding and appreciation of what the other teachers are trying to do. The question of whether such experiences should be labeled vocational or general is irrelevant. The important consideration will be the quality of the learning experience.

Industrial arts should lead the way in offering learning experiences that provide better orientation for living and working in a technological society. This calls for something more than the turning out of cedar chests, welded end tables, and copied drawings. The challenge is one that has to be met first in our teacher education programs.

Applied science, applied history, applied English, and so on, must find their way directly into the industrial-arts teacher education curriculum. To this point we have largely left the job to others and too often the results have been sterile. There is a natural relationship between tools and materials and the study of anthropology, history, science, mathematics, and most of the other disciplines.

The inscription over the entrance to the International Folk Art Museum in Santa Fe, N. Mex., gives us a clue to the potential waiting to be exploited. It says this: "The art of the craftsman is a bond between the peoples of the world." By 1970 I hope we will be doing a much better job of preparing our teachers to interpret this concept to the young people with whom they will be working.

I have a hunch there will be many more college courses of a real general shop nature by the time the next generation is on the scene. This implies that we will have gotten at the task of getting some useful facts about the problems and possibilities of the general shop. To this point our research efforts in this area have been rather sterile and uncreative.

Mention of research allows me to include a thought about graduate work although this was not in the scope of my essay. By 1970 our graduate programs will contain many more laboratory courses. Such will be necessary to prepare the kind of teacher we envision. We are beginning to get some specific suggestions for developing technical courses that are truly graduate in character.

During the next 15 years we will be evolving a theoretical frame of reference to guide the research in our field. We will be testing and retesting the hypotheses which guide our actions, and this will give us useful facts for constructive progress. I fondly hope that by 1970 we will have a significant number of dedicated research workers who can give their entire attention to ferreting out the facts which are so badly needed for our continued development.

In trying to steer these few thoughts toward a conclusion mention should be made of the 1970 climate in which our teacher education programs will function. Many more of our students will be in school on scholarships. The next few years will witness a long-needed breakthrough in teacher pay and public support for education. Perhaps the most heartening sign on the horizon is the determined effort of many lay leaders to raise the social status of the teacher. This is a natural outgrowth of the sober realization that the battlefield of the next decade may well be the schoolrooms of the world. The battle of brains has only begun.

With that thought I am going to stop adding more, knowing full well that much has been left unsaid. As mentioned at the outset, and as you now know, these sketches have been crude, with a few bold strokes here and there, alongside many fuzzy lines. Some of the sketches were somewhat abstract —you'll have to add your own meaning.

But I hope you have noted a recurrent theme in all of these efforts. It is this: Without question breathtaking, fabulous changes are in the offing, both as regards the problems to be met and the possibilities that will unfold as we struggle with the problems. The money and machines will be available to help us. The challenge is the personal one of using our mentality and creativeness to the greatest advantage so as to make optimum use of the money and machines.

We must strive boldly and creatively to anticipate the future. The blueprint to oblivion is to stumble along blithely attempting to re-enact the past. Methods and materials become obsolete, but good ideas never grow old. We must use our great heritage of the past as the seed that will bring forth the harvest of the future. Industrial-arts teacher education in 1970 will not be a job for little men.

School—Industry Field Day

LYNN KINGSLEY
Muskegon Catholic Central High School
Muskegon, Mich.

The Muskegon Chapter of the American Society of Tool Engineers (A.S.T.E.) together with the high schools of Muskegon and Grand Haven, combined efforts to sponsor a field trip for senior high school boys of this area interested in various types of engineering. Its purpose was twofold; to create more interest in engineering, and to show the great need for people in that field.

The A.S.T.E. organized an educational committee, designed to assist the chapter in promoting and carrying out educational policies and functions. The first step in that direction was to make one faculty member of each of the local high schools an associate member. This committee is made up of both teachers and industrial men and includes the following people: Jay Retsema, department superintendent of the John Wood Co., Muskegon; and chairman of the committee, Vern Nephew, plant engineer of Shaw, Box Crane, and Hoist, Muskegon; James Swinheart, of Clark Sanding Co., Muskegon; Paul Hornak, of Economy Tool Co., Muskegon; Robert Mason, secretary of Muskegon Manufacturing Association; John Phaff, of Keller Tool Co., Grand Haven; Gene Babcock, of Challange Machinery Co., Grand Haven; John Trumble, of Keller Tool Co., Grand Haven; John Baker, chief engineer of Norge, Muskegon; Kenneth Kolberg, drafting teacher of Muskegon High School; Ed Huttinga, director of adult and vocational education at Muskegon High School; Earnest

Swanson, math teacher of Grand Haven High School; Fred Hawley, physics teacher at Muskegon Community College; Allen Courtright, drafting teacher at Muskegon Heights High School; Vernon Nyhoff, science teacher at Muskegon Christian High School; and Lynn Kingsley, drafting teacher at Muskegon Catholic Central High School.

The first job of this committee was to organize the field day. Because of the large numbers of boys enrolled in the six participating schools, we limited the number to just those interested in engineering. A list of students from all the schools was compiled and assigned to the kind of plant that featured the type of engineering each student had previously indicated an interest in.

Each individual school held meetings of their own students to discuss topics pertaining to engineering. Other topics discussed were how to conduct themselves while on the trip, what type of product each plant manufactured, and some of the things to look for while touring the plant. Each student was also notified at this time what engineering firm he would go to, where and when to meet on the day designated for the trip, and the approximate schedule for the day.

At the same time the student meetings were going on, industry was also at work organizing their plans for the day. Muskegon industries were represented by the following firms: Morton Manufacturing Co.; Norge Division of Borg-Warner Corp.; Sealed Power Corp.; S. D. Warren Co.; Brunswick, Balke, Collender Co.; Bennette Pump Division of John Wood Co.; Campbell, Wyant, and Cannon Foundry Co.; and Shaw Box Crane & Hoist Division of Manning, Maxwell; and Moore, Inc. The industries from Grand Haven that took part in the field day were as follows: B & B Engineering Co.; S & D Engineering Co.; Keller Tool Co.; and Challange Machinery Co. Each of these large industries spent many man-hours of organization and preparation for the field day and did an outstanding job.

On the day of the field trip, all students met in the auditorium of Muskegon High School and sat in their proper section, which was indicated by large printed signs of each firm. Representatives from the participating plants furnished transportation for the boys to the factories and brought them back again at the end of the day.

In describing the planning and organization that went into the plant tours, I will use the Shaw Box industry as a typical example.

The group of students was divided into smaller groups of from five to eight boys with an engineer assigned to each group. Before the tour of the plant, all students gathered at a group meeting at which time the plant engineer gave a general talk about the plant, its products, job opportunities, etc. Each student received a print of one particular part of a product, which he would use in following its progress through the plant from beginning to the end.

The groups started the tour in the drafting room where they watched a tool engineer make a drawing. The process of making an oslid print followed with an explanation of how and why different drawings are kept and filed. The process and production engineering department was visited next where the students learned how a new product was processed in terms of tools, materials, and labor needed to make the item. This processing must precede every new product or job the firm takes on in order to determine the price at which the company could make a reasonable profit. Next the groups went into the machine shop where they watched a demonstration of each operation needed to completely finish the part. After the part was machined, the groups went to the assembly area where it was assembled with other parts on an assembly line. The testing laboratory came next where each item was inspected and tested. Finally came the shipping department where the product was packaged and crated for shipment.

Throughout the tour, the students were given every opportunity to ask questions and have discussions on any phase of engineering they did not understand.

At lunch time the representatives of each firm took their groups out to lunch. While they were eating, further discussions developed about how various things were done on the job.

The program for the afternoon was given over to group meetings. The 140 boys were divided into three groups. One group meeting at Muskegon High School, one at Muskegon Heights High School, and the other at Muskegon Catholic Central High School. John Baker, national delegate for educational work, arranged for three speakers at

Machine-shop student Gene Anaya. Teacher of the course, James Gibson. Photo by advanced student Jim Booth. Submitted by Harry A. Goldstein, APSA, Photography instructor, Tucson High School, Tucson, Ariz.

each of the three meetings. At Muskegon High School was Robert Broersma, of B & B Engineering Co., Grand Haven; John Medendrop, of Economy Tool Co., Muskegon; and H. Whitmore, director of engineering at Norge in Muskegon. Muskegon Heights High School had Richard DeYoung, of S & D Engineering Co., Grand Haven; Clarence Buehrle, of Buehrle Engineering Co., Muskegon; and Pat Kennedy, research and engineering division of Norge, Muskegon. Muskegon Catholic Central High School had as its panel members Paul Thurfors, owner of Acme Engineering Co., Muskegon; Paul Hornak, sales engineer of Economy Tool Co., Muskegon; and William Chapin, assistant to the director of engineering at Shaw Box in Muskegon. A topic outline was given to each of the speakers several days before the meeting which covered the phases of engineering to be discussed during the afternoon meeting. A panel discussion developed with each member of the panel contributing his ideas about the topic from the practical side of engineering as it affected him in his work. A moderator kept the discussion moving, at the same time watching for questions from the student groups. At the conclusion of the panel discussion, the students were transported back to the original starting place.

There were many favorable comments from both students and factory personnel as to the success of the field trip. Measured in terms of student interest and enthusiasm while on the tour, together with the results of a student questionnaire, seemed to bear out that fact.

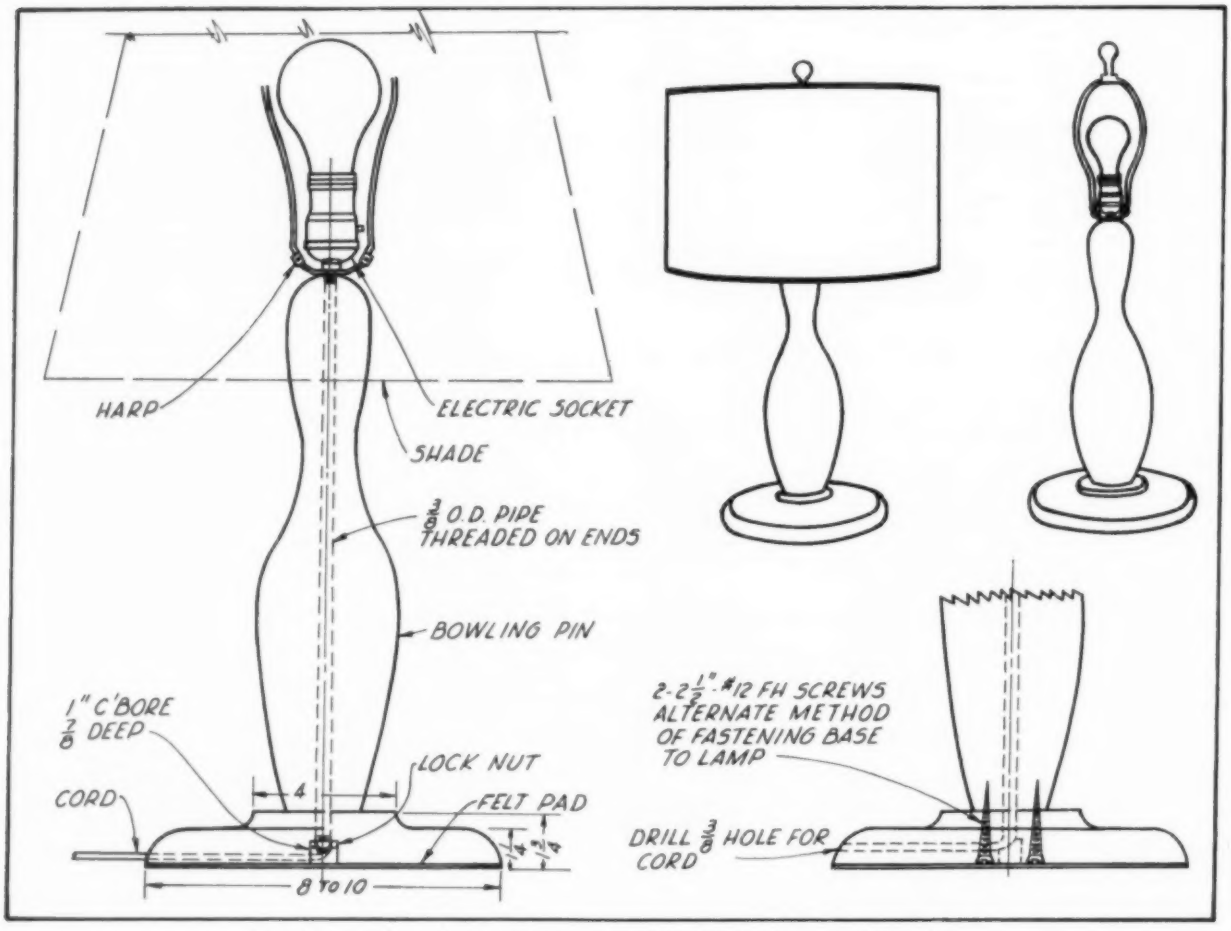
The following chart is a summary of the returned questionnaires.

SUMMARY OF STUDENT-INDUSTRY DAY*
107 Responses

Please evaluate today's activities by circling one of the numbers after each of the following points: (1) represents highest rating, (4) represents lowest rating.

	(1)		(2)		(3)		(4)	
1. Explanation of engineering processes	56	52.3%	41	38.3%	8	7.5%	2	1.9%
2. Observation of engineering work	54	50.5%	28	26.1%	23	21.5%	2	1.9%
3. Opportunity to ask questions	94	87.9%	9	8.4%	3	2.8%	1	.9%
4. Conversation at lunch	64	59.8%	25	23.4%	9	8.4%	9	8.4%
5. Panel discussion in afternoon session	57	53.3%	35	32.7%	14	13.1%	1	.9%
6. Opportunity for discussion	65	60.8%	36	33.6%	5	4.7%	1	.9%
7. Value of today's program in helping you to learn about engineering	61	57.0%	34	31.8%	10	9.3%	2	1.9%
8. Value of today's program in helping you select a vocation	39	36.5%	40	37.4%	17	15.9%	11	10.2%
9. How did today's program compare with other counseling and guidance help you have received in high school	65	60.8%	36	33.6%	5	4.7%	1	.9%
10. Value of today's program in comparison with in-school programs, such as college day, assembly programs, etc.	77	72.0%	26	24.2%	2	1.9%	2	1.9%

*Muskegon Chapter of The American Society of Tool Engineers Education Committee, "Student-Industry Day Questionnaire," Unpublished Questionnaire, Muskegon, Mich., 1956, p. 1.



Bowling pin lamp by Louis Barocci, Cudahy High School, Cudahy, Wis.

Conference Report —

Driver and Safety Educators Association of New York State

DOMINICK A. FORMICA
Bay Shore High School
Bay Shore, N. Y.

The conference was held in Utica, N. Y., on April 23, 1957. The day began with exhibits and booths set up in the gymnasium of the Whitesboro Central School. Among the many items on display was a classroom experience driving machine by the A.A.A. called "Auto Trainer," a knowledge testing device which electrically scores correct responses to questions which are projected on a self-contained screen, and a new A.A.A. booklet entitled "How To Drive" which has been copyrighted this year. It is designed as a refresher for veteran drivers and a good adult education text.

The keynote address was delivered by Norman Key, executive secretary of the National Commission on Safety Education, National Education Association. The topic, "The Future of Driver and Safety Education," brought out, among other things, the imperative need for additional and expanded programs of driver education in view of the mileages being accrued on the roads at present and the vast increase expected in the near future.

The discussion groups held at this point delved into the problems of making driver education compulsory, driver attitude improvement, better adult driver education programs and the use of the MV-285 (Blue) card relevant to its interpretation, regulations and basis for awarding them.

I attended the latter group. The discussion leaders were Cullen Burke, Head Motor Vehicle License Examiner, Bureau of Motor Vehicles; G. Challis Franklin, supervisor of Driver Education, State Education Department; and Edwin A. Christmann, instructor of Driver Education, Niagara Falls High School. Much time was spent in ascertaining the criteria of measurement for awarding the MV-285 (Blue) card. The regulations state that the teacher "may" award the card to students who have "satisfactorily" completed the course. Mr. Burke suggested that there is latitude for personal interpretation of the word "satisfactorily."

Evident was the type of student which caused the pondering, the one who comes to class having a junior license and who comes with the attitude that he "knows it all." The motivation on his part is the Blue card only. Another is the immature and irresponsible type who is generally troublesome at school because of improper personality development and attitude. Either of these students will do just enough class work of questionable quality to pass. He most usually is a good technician behind the wheel but skill alone is not a measurement of mature, conscientious, sportsmanlike automobile operation.

The consensus of thoughts relevant to awarding the Blue card were:

1. Not to misinterpret the phrase "satisfactorily completing the course" as meaning a passing grade in scholastic or skill ability only;

2. Not to downgrade to failing the grade of a questionable student since most high schools give course credit toward graduation for driver education, and that this practice will encourage the theory that the Blue card is automatic with a passing grade;

3. That the driver education teacher should feel responsible as to the privilege he is awarding to each student and that this award may be given on the primary requisite of a good driver, proper attitude and maturity;

4. That the driver education program should be completely divorced from the state examination for receiving a license. The object of driver education is to make a good driver for life, not for the test, and that the belief that the driver education or driver training course is almost solely a course in auto driving with the necessary scholastic frills to justify its function in a high school is a deterring frame of mind on the part of some teachers of the field, school staff, administrators, the students themselves, and their parents and community. An aside relevant to this point by Mr. Burke was that the practice of state driving tests which are arranged for and supervised by the driver education teacher as a terminus to the course is all but discontinued with the exception of some on Long Island; and

5. That the basic function of driver education is psychological, as in respect to proper attitude formation, and also important but definitely secondary is proper skill formation.

Mr. Burke, Mr. Franklin, Mr. Christmann, a handful of the discussion participants and myself had an informal discussion after this where I learned that at one school, 50 per cent of the students were awarded Blue cards and at another, about two thirds.

Luncheon was held at 12:30 p.m. at the Trinkaus Manor in nearby Oriskany, N. Y. It was a refreshing interlude where I renewed acquaintances with many old alumni and with John Kowalski and Lou Frani, both of whom have been former classmates of mine and are now officers in the association. Mr. Kowalski is still at the Alma Mater, but now as an instructor of driver education. A pleasant and unexpected surprise was the attendance of acquaintances from the Automobile Club of New York. I also met two of the teachers who attended from the Suffolk County area.

The luncheon address was delivered by Amos Neyhart, director of the Institute of Public Safety, Pennsylvania

State College. Called the father of driver education, Mr. Neyhart spoke of things to strive for in the future. Among these were parkway and turnpike training, using and contributing to up-to-date methods and research media, professional advancement in the field, and high quality programs. The debate following this was moderated by Dr. Herbert Stack, director of the Center for Safety Education, New York University. Dr. Stack had been a discussion leader in the morning session. For debate was the topic, "We Are Making Reasonable Progress in Traffic Safety." The participants represented the National Safety Council, the Pennsylvania Department of Public Instruction, the National Association of Automotive Mutual Insurance Companies, and the American Trucking Association. Both the affirmative and negative participants relied heavily on statistics which brought out that percentagewise, reasonable progress has been made but numerically and with the higher horsepower, speed, and the different type of and increased driving expected in the near future, the rate of traffic mishaps projected by current standards shows a vast numerical increase that we should be preparing for today.

One hundred and eighty people attended the conference which, at this point, was ended with the annual business meeting.

Opportunities in Standards Engineering

FULTON R. MAGILL
Manager, Central Standards Department
Rockwell Manufacturing Co.
Pittsburgh, Pa.

The creation and the acceptance of standards applicable to mechanical production, scientific research or commerce is becoming an ever increasing part of American industry and commerce. The creation of such standards is no longer a haphazard effort but one that now engages the minds of engineers and scientists, especially trained and skilled in the determination and establishment of such standards.

Simply stated, for example, standards permit fire hoses to fit every hydrant in a town or a garden hose to fit any threaded faucet in a home. There are many different types and sizes of light bulbs but they fit in their respective sockets irrespective of voltage or amperage up to a certain limit.

When electric irons were first produced, one large manufacturer had flat prongs for the electric plug and the other had round prongs. The following year the manufacturer of the iron with the flat prongs decided to switch to the round prongs so that the same type socket could be used on all iron cords. At the same time the manufacturer of the irons with the round prongs switched to flat prongs for the same reason. This was a costly attempt at standardization which had no value. It was only after joint action by both companies that a standard was developed.

Good standards plus scientific progress have made automation possible and reduced the costs of the automobiles, home appliances, and the tools used to make our lives easier. These standards are developed by following specific principles used by a standards engineer.

Standards engineering takes the knowledge of the engineer or scientist and adapts it to a product so that the company making the product finds it profitable to do so. It helps the engineer to turn his ideas into practical and profitable merchandise.

While a standards engineer must have a good technical background, he must have other qualifications also. He must be able to understand technical problems and describe them in understandable English. He must be able to analyze similar things and select the one of the most value. He should have a knowledge of manufacturing processes and business methods — in fact, should have some familiarity with all phases of industry.

In his work, a standards engineer also becomes involved with international matters. It is necessary that the products made in one country be usable in another. There are no national boundary lines which limit standardization.

The standards engineer uses this knowledge of national and international standards and technical progress in his own company when company standards are being made. He relates these to the work being done and by using the principles of standards engineering, a company standard is created. It is such standards that make it possible to manufacture things at a price which the customers can afford to pay.

Standards engineering has broadened the opportunities in technical fields for the high school graduate. It has opened the door a little wider for the student possessed of both engineering and administrative aptitudes.

Technical education is the foundation of the standards engineer. Education plus experience and aptitudes involving many phases of industry are the qualifications of the standards engineer.

Did your luggage get a scuffing last summer? Match the color of the damaged parts with a coat of liquid shoe polish. When dry, finish with thinned coat of pure, white shellac to hold the polish and give a glazed finish. — *Shellac Information Bureau.*

The Olive Tree

ORVILLE A. OAKS
Wilmette, Ill.

The olive tree (Olea europea) is the most useful member of the olive family, which also includes our well-known ashes and the ornamental lilacs. It is the first tree mentioned in the Bible, when in the year 601 Noah released the dove from the Ark and it returned with an olive leaf. Since ancient times the olive tree has been held sacred by the Greeks and Romans, it being the sacred tree of Athena, Greek goddess of Wisdom. According to a Greek creation myth the gods gave Athena the honor of naming the new city of Athens since she created the olive tree, a symbol of peace, while her rival Neptune, God of the Seas, could only create a horse, a symbol of war. Every Athenian sanctuary and temple had its special sacred olive tree as a symbol of divine peace and protection. The product of the tree — olive oil — had almost a religious value to the men of Attica. Physically, Greek civilization depended greatly on the olive and from the Golden Age of Pericles on, Athenian coins were decorated with an olive branch. It was used as a boundary tree to separate Athenian estates, and the great lawmaker, Solon, set forth rules for its planting in Athens as a tree of general reverence "a symbol of freedom, hope, mercy, purity and order." A crown of olive was awarded the victor in the Olympic games started by Hercules, this crown supposedly made of a branch from the sacred olive tree growing at Olymphia. During the Athenian wine festival, held in October, a branch of olive covered with white and purple wool and loaded with fruits of many kinds, was carried in the procession to the temple of Apollo, the Sun god. This holy bough was deposited with Apollo as a plea to the Sun God for help during times of famine. The ancient Persians and Armenians also held the olive in reverence and generally carried a branch of it when approaching their gods.

The olive, until recent times, at least as late as 1900, was still planted in Central European fields as a charm tree, an insurance for a good harvest and protection against hail. Venetians placed a branch of it on their chimneys during thunder storms to protect them from lightning. Superstitious peasants of Rome and Tuscany kept a blessed branch of olive hung over their door or in their home, believing it would keep witches and sorcerers away. They also considered it lucky to dream of olives or an olive tree, such dreams denoting prosperity or happiness, and a "speedy marriage to one's lover."

The ancient Hebrews venerated the tree, and the Jews of Palestine still consider it an emblem of peace and plenty, its intimate association with Christ giving it an added holiness. Mohammedans in Palestine and Artas — traditional site of Solomon's gardens — still consider the olive sacred or holy, one tree above all others, growing near the Dome of the Rock, being considered the Prophet's Olive. Tradition has it that this tree sprang from an olive pit thrown down at the time the Prophet visited Jerusalem. The fellahins of Palestine consider the olive as a "Blessed Tree" and occasionally swear by it, believing it sacred as a giver of food and light and blessed by God Himself. Due to their extreme need for fuel, they will cut an olive, risking God's punishment. The olive was engraved on the tombs of the early Christian martyrs as an emblem of peace and reconciliation. Even today, Christians the world over hold the olive in respect in the Holy Land, especially in the Garden of Gethsemani on Mount Olivet, where Christ was wont to go for peace and prayer.

The original home of the olive was probably in the countries bordering the eastern limits of the Mediterranean, but today it is widely planted in California, Italy, Greece, and the Holy Land as well as in the Mediterranean basin. Although an evergreen within its useful range, it is exceedingly slow growing. Eight of the supposedly original trees are still growing in the Garden of Gethsemani, gnarled, hollow twisted shells, but still bearing fruit as in the days when Christ walked in the garden. Their originality may be disputed, but their ancient lineage is certain. The olive's great value to ancient man probably played an important part in its being held sacred, and in the superstitions and beliefs which surrounded it in ancient times. The oil from the fruit was a butter substitute in biblical times, and it still is used for that purpose today. It was used as food, soap, medicine, and the base of perfumed ointments which sold in Athens and Rome for fabulous prices. The lamps of Tabernacle and Mosque alike depended upon it for light, and today in the Holy Land it is still used in spite of modern methods. Old-fashioned people — my parents included — still anoint their heads with olive oil on special occasions as did the kings and prophets of old. My olive wood came from Palestine as the cover of a book of pressed Holy Land flowers. The wood is extremely hard and tough, a rich yellowish brown beautifully grained with dark wavy streaks, sometimes nearly black. The Greeks used it for door hinges and carved images. Today, choice olive is used mainly for decorative carvings, and for pious objects and souvenirs sold to pilgrims and tourists in the Holy Land. The black streaks in the heartwood are a sign of mourning according to a Mohammedan legend. When the Prophet died all the trees except the olive went into mourning and shed their leaves. When the olive was reprimanded for not doing likewise it replied — "Cut open my body and see how my heart is bleeding."

Last year, steelmaking capacity was increased in 15 states. — *Steel Facts.*

Industrial Arts and Vocational Education

JOHN J. METZ, Editor

THE END OF THE SEMESTER

THE end of the first semester of the 1957–58 school year is approaching apace. That should cause every shop teacher to stop and ask himself the question: "What have I done for the students who have been with me since September, and what should I do for those who enter my shop this coming semester?" Of course, some of the students may not be of an age where they can plan to leave school to enter the workaday field as yet. Nevertheless that time will come for them sooner or later, too! Have we prepared them for this serious step?

Have we called their attention to the fact that if this is their year of graduation they have several serious decisions to make? Have we given them helpful vocational guidance information? Have we shown them that their best bet might be to go to college for at least another year or two; or to enter an apprenticeship with some reliable firm to fit themselves for a chosen trade?

Do they know that the boy with technical training has a much better chance to advance in industry than the one who has no such training at all? If you have not served your students in this fashion, this is the time to think seriously on how to make good on your failure. The present era is not so favorable to the young job hunter who has just left school.

The present slowing up of work in some fields may cause severe heartaches to the boy who has just finished his schooling. What is he going to do now? He may have had some definite plans in mind to enter a certain trade or field of work. What if there is a slump in the particular field of work for which he thought that he had prepared himself?

If you have not prepared him for just such a happening the disappointment may be almost too much for him to bear. The fact that he could not get a job in the field for which he was preparing himself, may cause him to resolve stubbornly that he will not take any other type of work until there is an opening in the field of his first choice. It may take quite a while until such an opening develops; in the meantime he may have developed quite a number of objectionable habits which will be hard to overcome in the future.

Show such a student that there were many great men who never worked at the type of job for which they had prepared themselves. Their success stems from the fact that they did not lie down, but went right ahead with the kind of work which they could obtain until they had mastered it to such an extent that they no longer wanted to return to the occupation of their first choice.

The task before us then, is to help our students realize that there are many roads to individual success, and if one road is closed to us, we must try another and force that to lead us to victory.

STEEL IN 1957

THE 1957, December *Steel Facts* reports that the Soviet Union's production of steel ingots in 1955 was eight years further behind the output of the United States than it had been in 1913, according to a recent study made by G. Warren Nutter, University of Virginia, for the National Bureau of Economic Research, Inc., New York.

According to this study, the 1913 production of Soviet steel ingots was roughly equal to the United States production around 1892 — 21 years earlier. That means that the lag in 1913 was 21 years.

In 1937 this lag had risen to 32 years and fell to 29 years in 1955. Thus, the Soviet production was eight years further behind American production in 1955 than it had been in 1913.

According to this it took the Russians 42 years (1913–1955) to accomplish what the United States had done in 34 (1892–1926).

If the Soviet Union's goal for steel ingots is reached in 1960, the lag in total output will have fallen from 29 years in 1955 to 17 years in 1960, which is four years less than the lag in 1913.

The American Steel industry in November, 1957, no doubt has produced over 114 million tons of ingots and steel for castings. That will be approximately six million tons more than the industry had capacity to produce five years ago.

Shipments of heavy structural shapes will probably be in the neighborhood of seven million tons. This will be a new high.

Shipments of another construction requirement — steel piling — will most likely approach a total of 600,000 tons. This will be about 38 per cent higher than the 1956 which was the former record year and produced 434,103 net tons.

Steel plate will approach an estimated output of nine million tons, and the oil country tubular goods are pointing to a record of about three million tons. Line pipe shipments are scheduled for a new high of approximately four million tons.

The leading 1957 market groups are the following: construction, including maintenance; contractors products (more than 16 million net tons); warehouses and distributors (a little less than 16 million net tons); automotive (yearly, 14 million net tons); containers (more than seven million net tons); and machinery, industrial tools and equipment, which will require about five million net tons.

The shipments of tin plate from mills in the United States during 1957 will, most likely, also reach a new record which will approximate the 1956 output of 6 million net tons.

The 1956 can output was 4.8 million net tons of steel. More than one third of this went into fruit and vegetable cans, while beer cans took about one sixth of that total.

It takes steel to drill for oil and gas; more steel to carry the crude products to market; and still more to process petroleum into a broad array of useful products and by-products.

These uses of steel are at record levels and are expected to increase. Oil and gas executives, celebrating the 98th anniversary of their industry this year, foresee a future of unprecedented expansion. One leader expects the use of petroleum to be doubled by 1975. Another authority estimates that oil and gas will supply 73 per cent of the nation's energy requirements within eight years.

All of these statistics may prove dry reading, but they will give the teachers as well as the students of our industrial arts and vocational education a good idea that the United States is still a country whose progress can make all of us very proud. Even though many of us are not working in the steel industry, yet we all have a part in making our country great if we prepare to be good workers in whatever activity we may be engaged, whether that be in agriculture, manufacture, business, or one of the professions.

Another point that we should not overlook, is the fact that the payroll to accomplish this was over $4 billion.

Problems and Projects

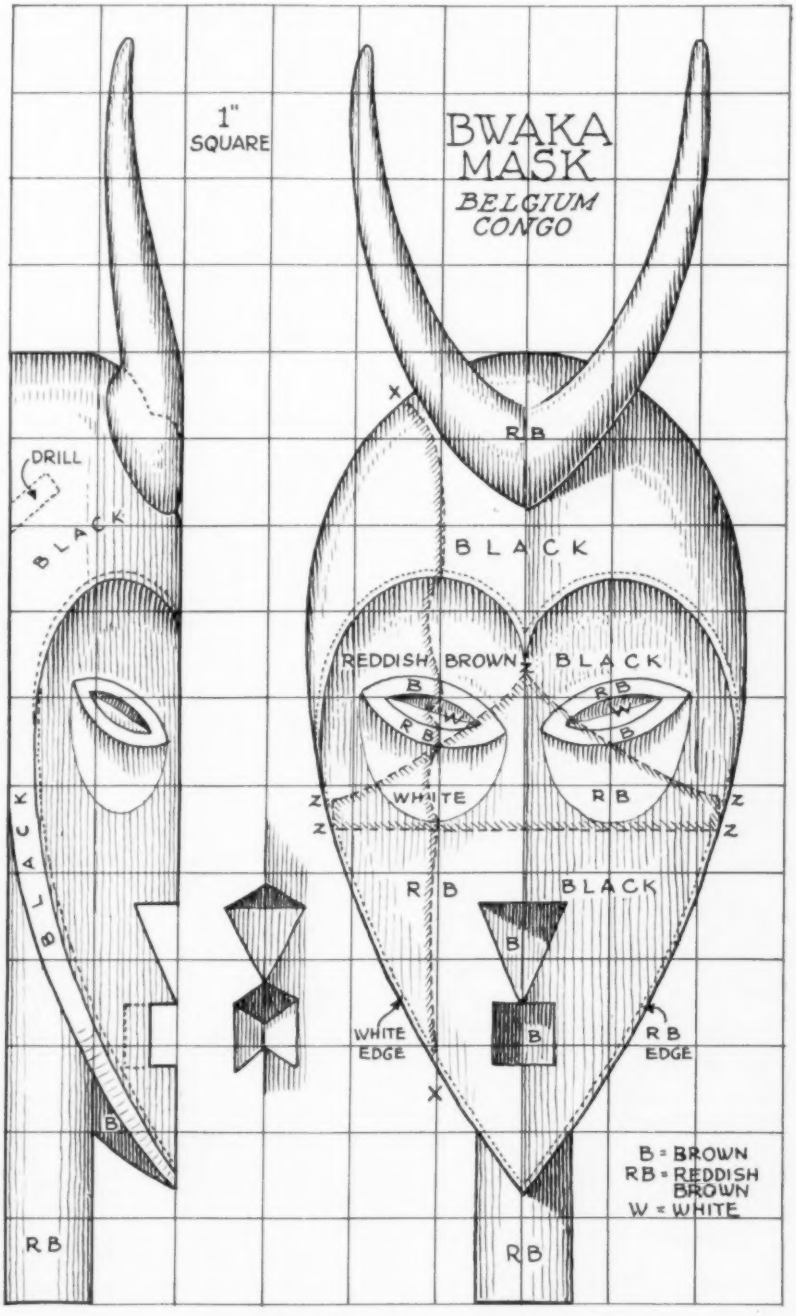
WHITTLING PROJECT — BWAKA MASK

BEN HUNT
Hales Corners, Wis.

Whittling the same kind of things the year round can become monotonous, if not to the whittler, to his family and friends. I like nothing better than to whittle katcina dolls, but soon my home and my cabin would be flowing over with them. And so it is with many other hobbies.

Therefore, we are offering in this series, a variety of objects to interest you and your friends, things you can display in your living room or den or recreation room, conversational pieces, so to speak.

Bwaka mask by Ben Hunt



Detail drawing of the Bwaka Mask

Wherever primitive masks are displayed, whether it be in a museum, an antique shop, or in a home, they invariably attract attention. There is something intriguing about them. Strange forms and symbolic features. Some are hideous, some very abstract, and others beautiful.

Also bear in mind that the natives who made them were untutored savages who worked with the materials on hand. Often very hard woods were used and their tools were of the most primitive kind. One thing, however, they did have, and that was boundless patience and time.

So perhaps you would enjoy carving or whittling a few of them. I have not chosen any that are too intricate and most of them can be whittled with a straight blade and a crooked knife or gouge.

This Bwaka mask is a good starter. It is not one that fits over the face, but is held above the face by the short round handle seen below, and these masks are not as deep as those worn over the face. Get a piece of clear white pine 2 by 5 by 14 in., if you wish to make it about full size. This means you will have to enlarge the drawing to 1-in. squares.

Trace the front view onto the block and saw it out on a band or jig saw. Now study the drawing, particularly the section z — z shown in dotted lines. Note that the sides are slightly concave. This waste wood is best removed with a drawknife. Note also the dotted line x — x running from top to bottom. This shows the contour along that part of the face, both sides being identical. A small crooked knife or gouge comes in handy in whittling the concave areas. The nose, or rather the upper lip is made with two simple cuts while the mouth is made by cutting out a small cube.

This mask is not sanded in the true sense of the word but it is sanded somewhat to take off all sharp projections. It was painted in a rather primitive manner inasmuch as I used primitive paints. The black was made with powdered charcoal mixed with water and a bit of Elmer's glue for a binder. The reddish brown was made by filing some red pipestone, to make a powder, which was mixed with water and glue. The white was powdered kaolin mixed the same way. But poster colors will give you the same effect if it is not applied too heavily. A light spray coat of plastic can be applied as a final finish.

To hang it, drill a ¼-in. hole in the back as shown. Drive a small nail in the wall and there you are. May I add that these are not authentic reproductions, although they might seem so to some people. They are merely interesting carvings or whittlings to dress up a room, or to break the monotony.

HANDY SKIRT HANGER

ARTHUR R. TANNER, JR.

Poughkeepsie, N. Y.

The skirt hanger described herewith is a one-evening project. It requires ⅛-in. diameter welding rod and clothespins or pinch-type paper clips. Straightened wire coat hangers may be used but welding rod gives a sturdier construction and will hold more weight without sagging. These hangers can be made to hold one or two skirts per hanger. The systematic lady will choose single hangers in order to keep matching suits together. The teen-ager who specializes in skirts will choose the double hangers hung ladder style from each other in order to hang many skirts in a small space. When this is done, the clothes rod will have additional space for other clothes. Step-by-step directions follow:

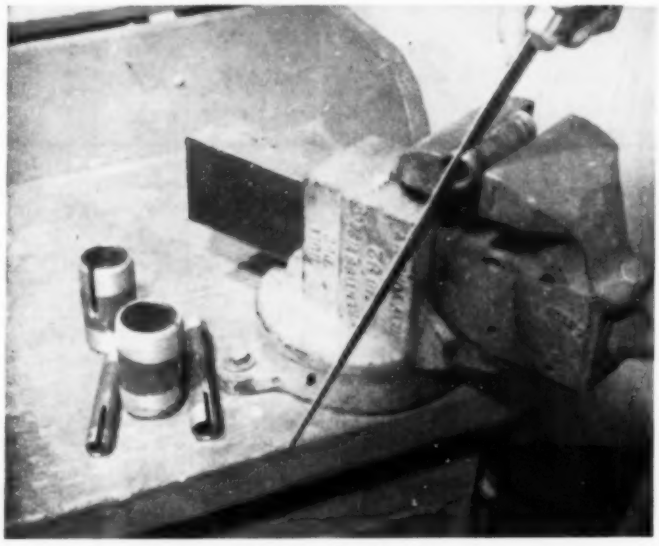


Fig. 1. Making the bending jig

1. Make the bending jig as shown in Figure 1, by cutting a slot ½ in. long and slightly over ⅛ in. wide in a short piece of ⅜-in. pipe.

2. Cut a 20-in. length of ⅛-in. diameter brass welding rod.

3. Put a file mark at halfway point — 10 in. from either end. Put file mark 6 in. from this center mark, each way.

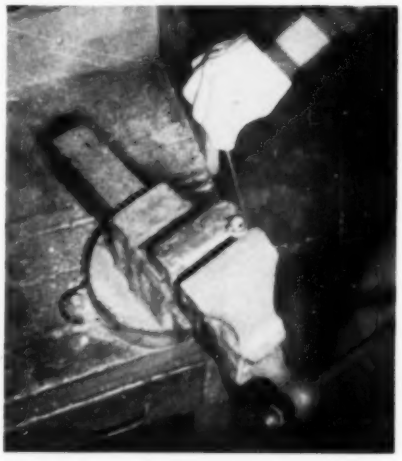


Fig. 2. Forming the scroll

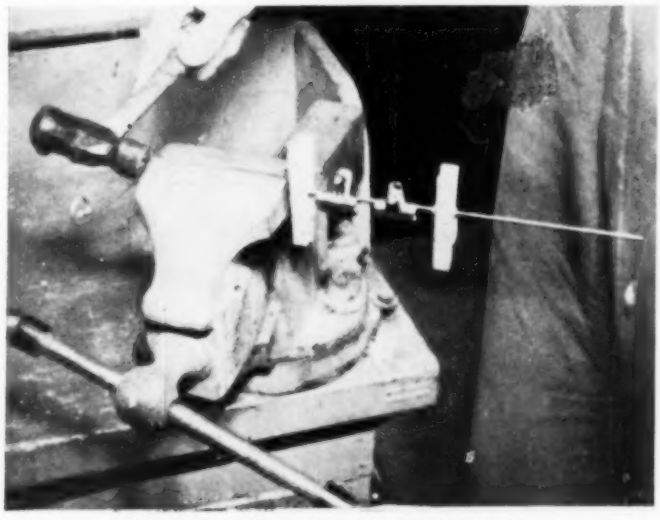


Fig. 3. Making the right angle bends

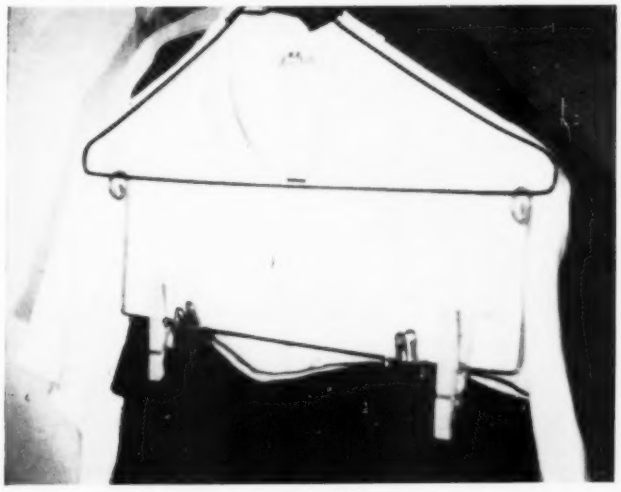


Fig. 4. The hanger in use

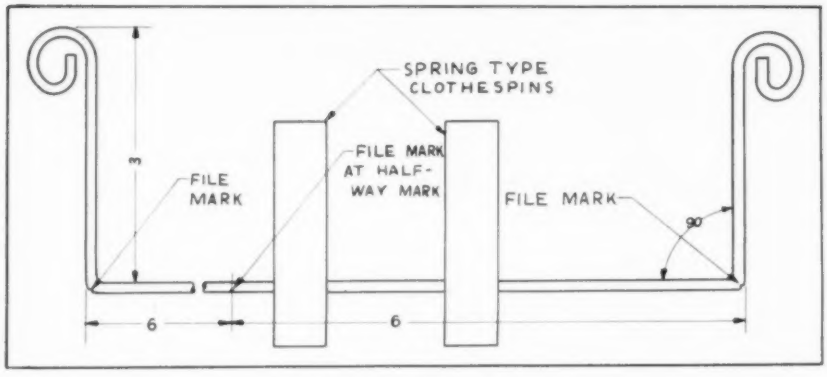


Fig. 6. Detail of skirt hanger

4. Put bending jig in vise. Insert about ¼ in. of one end of welding rod into the slot and then wind around the bending jig as in Figure 2. Now remove welding rod.

5. Slip welding rod through the spring of the pinch-type clothespsins or paper clips.

6. Insert ¼ in. of the straight end of the welding rod into the slot of the bending jig and wind around as in Step 4 and Figure 2.

7. To complete the forming, all that is necessary are the right angle bends located at the 6-in. file marks, as indicated in Step 3. This is done by placing the file marks on the outside edge of the vise jaws and bending the welding rod back until it is parallel with the edge of the jaw. See Figure 3.

8. Hook over crossbar of the wire coat hanger, and the skirt hanger is ready for use, as shown in Figure 4.

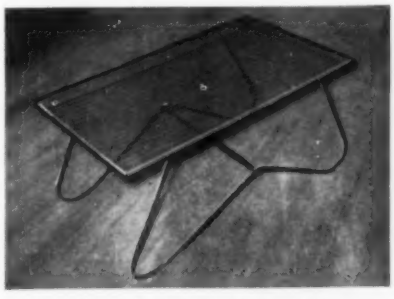
9. Figure 5 is a close-up of the handy skirt hangers in use.

10. Figure 6 shows the detail of the skirt hanger.

WROUGHT IRON COFFEE TABLE

E. J. TERRELL
Winsted, Conn.

The current emphasis on wrought iron work provides natural motivation for many projects in the general metals area. One of these wrought iron projects is the coffee table shown here. The design developed by the students represents much



Wrought iron coffee table

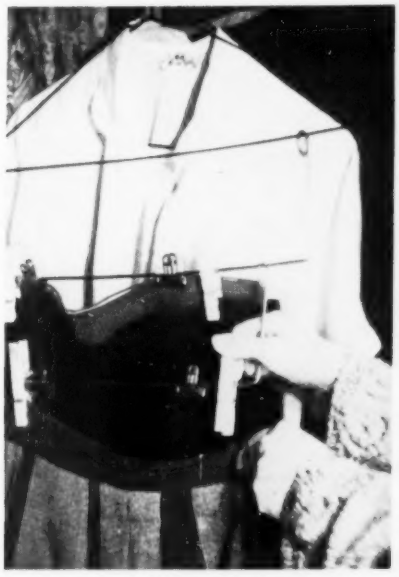


Fig. 5. Attaching another hanger in the ladder

effort and research. Local furniture outlets, newspapers, magazines, and furniture catalogs provided the contemporary motif apparent in the final design. The design of the finished product was adapted after viewing and evaluating several preliminary drawings.

In keeping with contemporary design simplicity was stressed. The table construction is simple enough to enable the average high school shop student to produce an attractive and useful project.

The table consists primarily of a frame constructed of ½-in. angle iron. The angle iron frame provides support for the perforated steel and the plate glass top. The design of the legs can be modified to suit the individual constructing the table.

Processes Involved in Construction

The processes involved in the construction of this coffee table include, project design, use of hack saw, layout, bending, oxyacetylene welding and cutting, filing, finishing, and particularly a familiarization with the various metals used and available for contemporary furniture construction.

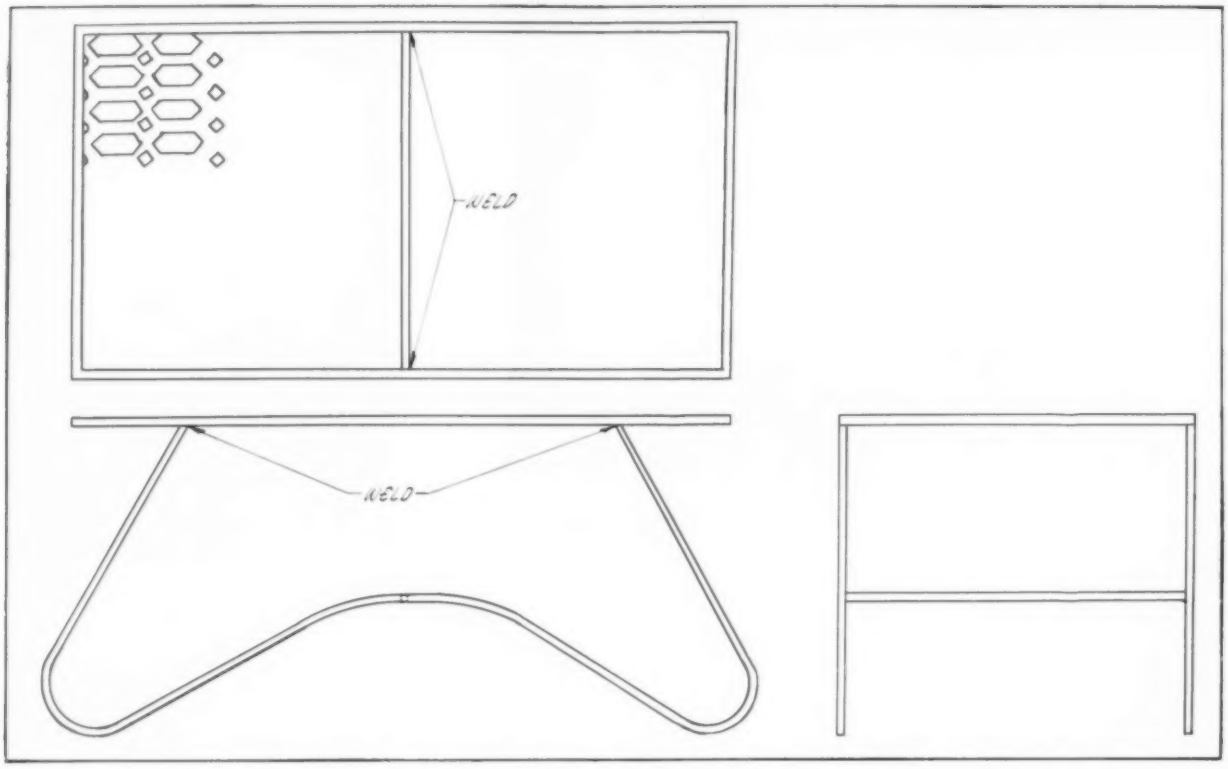
Tools and Equipment

Hack saw, layout tools, vise, combination square, file, oxyacetylene welding and cutting equipment, try square, bending jig or anvil.

Procedure

Legs and Support

1. Cut two pieces CRS ⅜ in. dia. to 76-in. length.
2. Remove with file any burrs left by hack saw.
3. Bend legs to desired shape in bending jig or on anvil.



Details of the wrought iron coffee table by E. J. Terrell

4. Cut one piece CRS ⅜-in. dia. to 19-in. length for cross support.
5. Remove with file any burrs left by hack saw.

Frame

6. Cut two pieces ½ in. by 19 in. angle iron.
7. Cut two pieces ½ in. by 35 in. angle iron.
8. Layout 45-deg. bevel on each end of the frame members.
9. Cut bevels with hack saw or oxyacetylene cutting tip.
10. Make trial assembly of frame and check for squareness.

(NOTE: If angle iron is available in 108-in. length much welding may be avoided by cutting 90-deg. notch in each of the three corners.)

11. Weld frame together.

Table Top

12. Cut out one piece of perforated metal 19 by 35 in. (various designs are available).

Assembly

13. Clamp legs in position to frame.
14. Check with square for proper alignment of legs.
15. Weld legs to frame.
16. Weld cross support to legs.
17. Weld perforated steel to frame.

BILL OF MATERIAL

No. of Pcs.	*Name of Part*	*Material*	*Size*
2	Legs	Cold rolled steel	Each ⅜ dia. x 76 in.
1	Top frame	Angle iron	½ x 108 in.
1	Cross support	Cold rolled steel	⅜ dia. x 19 in.
1	Table top	Perforated metal	19 x 35 in.
1	Glass top	Plate glass	¼ x 19 x 35 in.

18. File any sharp edges, joints, etc.
19. Finish by brushing or spraying with dull black lacquer.
20. Mount ¼ by 19 by 35-in. plate glass top.

Your wooden clothes hangers deserve cleaning too. Sandpaper down to the bare wood, brush clean and then cover with a thinned coat of pure, white shellac. — *Shellac Information Bureau.*

If wallpaper won't adhere to a plaster wall, try coating the wall with a thinned coat of fresh, white shellac. — *Shellac Information Bureau.*

A SIMPLE TRANSISTOR RADIO

M. D. Roberts
Associate Professor
Industrial Technology
and
W. O. Satterley
Assistant Professor
Engineering Graphics
Purdue University
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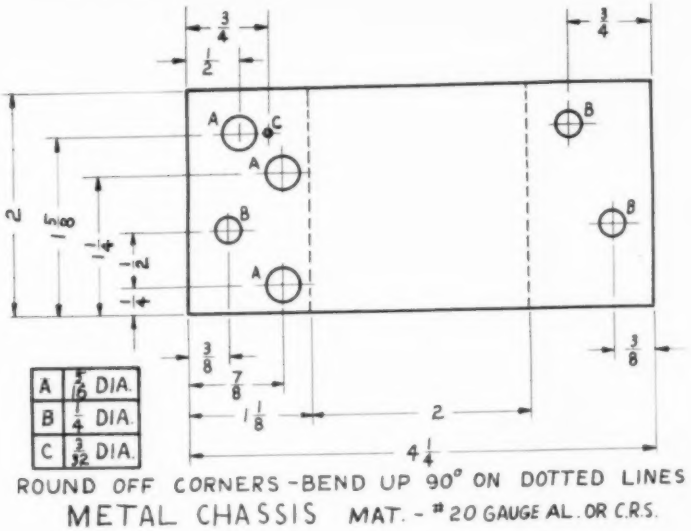
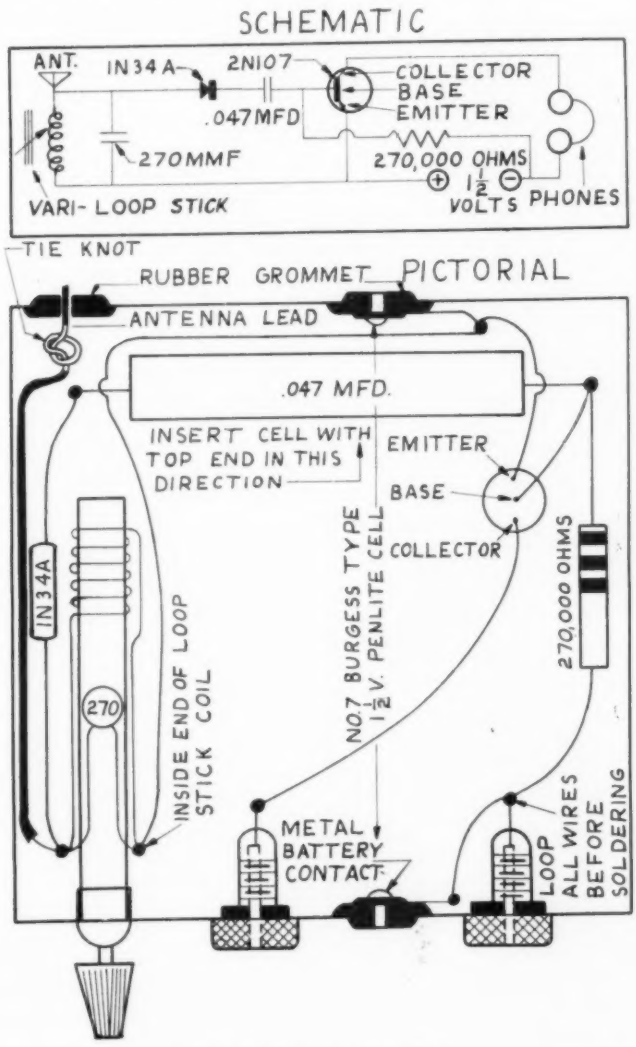
The transistor is relatively new in the field of electronics. Its small size and economy of operation has caused it to be widely accepted by almost everyone with a tendency toward experimenting with electricity.

This intriguing device is especially popular in many school shop programs which embrace electricity. The simple transistor radio described here is one such unit. It has been designed with the idea of incorporating a little sheet metal work into the project. A fixed capacitor of 270 micro-microfarads has been substituted for a variable tuning type to keep the cost down. The vari-loop stick being used instead for varying the frequency. The value of this capacitor may be varied between 200 and 300 mmf to best match the local





Detail of the transistor radio

frequencies. No ground is necessary for good reception with this radio, but in case one is added it may be connected to the positive line of the battery.

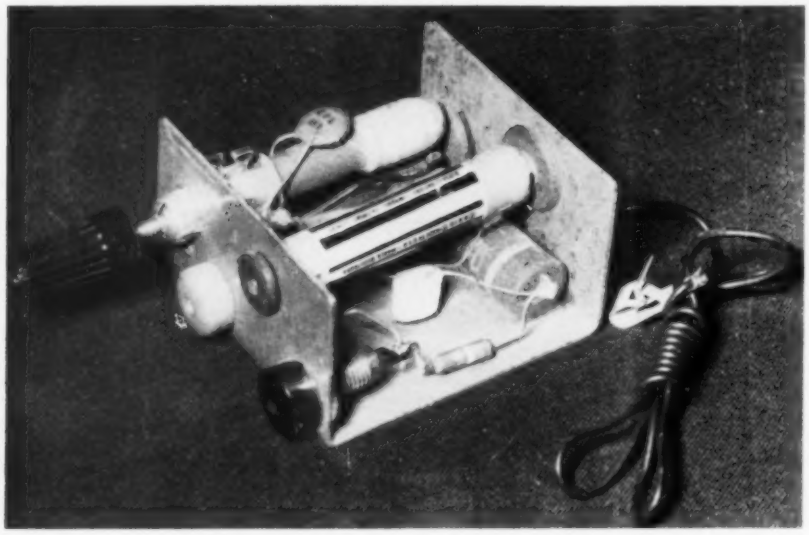
General Information

The discovery of the transistor principle in radio reception is both amazing and intriguing. Few electronic developments have done more to capture the attention, imagination, and interest of all ages. This tiny device uses but $\frac{1}{1000}$th the power of a similar type vacuum tube, yet will function equally as well as an oscillator, detector, or amplifier. It has no filament to burn out. It operates at a very low temperature. Thus it has a life expectancy of ten to twenty times that of a vacuum tube. The junction type transistor, which is the most popular, consists of a "sandwich" made up of two types of semiconductor materials of opposite polarity, the inner layer being opposite from the two outside layers. In the n-p-n type the inner layer is positive. In the p-n-p type it is negative. Three small wire leads are on a transistor, one from each of the three layers. The wires are identified by their spacing apart as they emerge from the transistor. The middle wire is called the *base*. The wire nearest to it, the *emitter*. The remaining wire lead is the *collector*. Transistors are very sensitive to heat. When soldering the wire leads they should be held with plier points between the body of the transistor and the point of soldering, so the heat will be absorbed.

The output from this simple transistor radio will be greatly affected by the type of antenna used. An outside wire strung horizontally about 100 feet long and as high as convenient will give excellent results. Good reception may also be obtained by using a metal lamp which is plugged into the 110 volt line, for an antenna. The type of headset is also an important factor. High impedance magnetic types of 3000 ohms or more are to be desired for best results. A single headset of 1500 ohms or more will give similar results.

Directions for Assembly

The connections to be made are few and simple. Be careful when soldering to the 1N34 diode and the transistor. Hold the wire leads between pliers to absorb any heat before it is conducted to the body of the transistor. A *schematic* and *pictorial* diagram are shown together on the attached sheet. The battery connections are made by inserting the two rubber grommets for insulation. A soldering lug is then slipped over the small aluminum rivets, which in turn is slipped into the hole of the grommet. The tension of the chassis can be varied by bending slightly, which will determine the firmness of the terminal points on the battery. Be sure you insert the battery with the center post positive at the back side. The improper polarity



A simple transistor radio

may damage the transistor. This small battery will furnish enough power to operate the radio for many months continuously.

PARTS

PNP Transistor (CK722 or 2N107)
Ferri-loopstick
1N34 diode crystal
3 rubber grommets
270 mmf fixed mica capacitor
.05 mfd tubular capacitor
Penlite cell
270,000 ohm fixed resistor
2 pin type phone jacks
Tuning knob
Assorted hardware

*Parts listed above are available in complete kit form for $2.95 each at The University Book Store, West Lafayette, Ind.

The first World War I troops arrived home from Europe on December 1, 1918. — *Wisconsin Military District.*

A FINISHING PROBLEM SOLVED

J. RUSSELL KRUPPA
Bald Eagle Nittany Area
Joint School System
Mill Hall, Pa.

Possibly many of you have encountered the problem of having too many boys ready for finishing and not enough finishing material to go around. This problem often occurred when we used the Sealacell process finishes.

To solve the problem I have painted several of the 12-oz. size liquid soap cans and labeled them to prevent mistaking the contents. This way we have several cans containing each of the three finishing materials necessary for completing a Sealacell process finish. This method permits more boys to work at the same time and with less confusion. Not only does this provide a more efficient finishing program, but one that is more economical also. Since it is easier to pour the finishing material onto a cloth from the smaller cans less material is wasted through spillage. Then too, the material has less of a tendency to *jell* or *set-up* when stored in smaller containers.

I have also found that a 12-oz. size or larger liquid soap cans containing shellac and linseed oil make it easier for boys to "load" their cloth when applying a French polish on the wood lathe.

These cans should be washed several times in hot water to insure cleanliness. They can then be appropriately painted and labeled to suit the whims of the instructor.

An easy, neat, and satisfactory method of labeling your cans is to print the desired title on masking tape with pencil, India ink, or a Flo-Master pen. You will find that a heavy coat of shellac applied after the ink has dried will prevent many of the penetrating finishes from making the ink *wash off* or *run*.

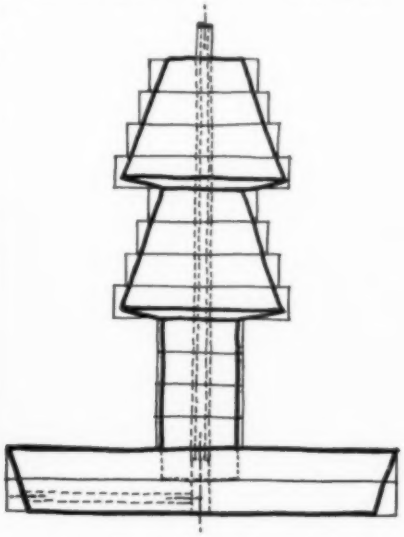
A method for storing finishing materials
— Photo by Frey Photo Service, Lock Haven, Pa.

PLYWOOD TREE LAMP

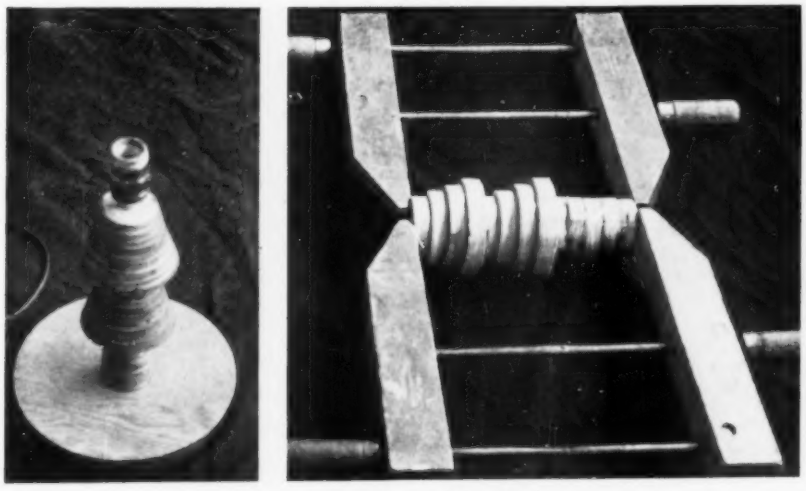
STAN SCHIRMACHER
Papago School
Phoenix, Ariz.

Small plywood scraps left over from other projects, or obtained at a reasonable cost from some cabinetmaking shop, can be utilized to make lamps on the wood lathe in a *plywood* tree pattern.

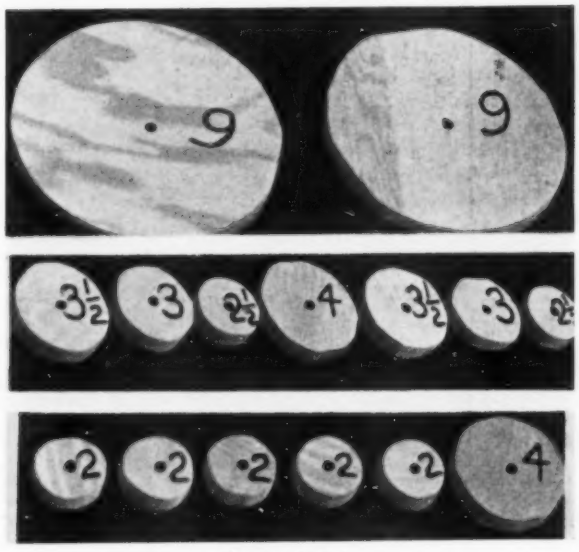
But, simply gluing the ¾-in. thick pieces together flatways does not make the assembly strong enough to withstand lathe turning, or even dropping on the floor. Each piece, therefore, must be drilled $^{13}/_{32}$, and assembled on a 10-in. length of ⅛-in. pipe when glued together, with ¾ in. pro-



Plywood tree lamp



Gluing up the plywood for the lamp



Plywood disks

truding from the top, to be held at the headstock end with a ½-in. 3-jaw chuck instead of a spur center. At the tailstock end the pipe is recessed ½ in., allowing for the use of a 60-deg. center. After finishing, the top of the pipe is threaded with a ⅛ pipe die.

The base is turned on a faceplate and recessed in the top center ¾ in. deep for the *tree trunk* to be glued in after finishing. Cord access hole drilling completes the job.

Other combinations worked out were substituting *Novaply* — a ¾-in. pressed wood — for the tree trunk as well as its use for the complete lamp. Many different combinations and patterns, of course, are possible.

USE OF ABRASIVES

Whether you're involved in sanding, grinding, or polishing operations in a factory, or a do-it-yourself project in the home workshop, there are precautions to observe in the use of coated abrasives.

The dangers involved in their use, according to the National Safety Council, come from dust and fumes, flying particles, breakage of belts and disks, fire and explosion, or personal contact.

The safe use of abrasives is discussed in Data Sheet D-452, "Coated Abrasives." Prepared and reviewed by safety engineers, all experts in the field, it is one of several published periodically by the Council.

Data Sheet D-452 covers everything from the hazards of coated abrasives to how to use belt, disk, and drum sanders.

Some important points:

1. Polishing, sanding, grinding, or similar operations creating a spark hazard should not be undertaken near flammable liquids, or in areas where explosive dusts are present — unless special precautionary measures have been established.

2. When it is mechanically impossible to guard the abrasive — which may be in the form of a belt, disk, or drum — it may be desirable to provide the operator with a protective apron, gauntlet-type gloves, and a face shield.

3. Coated abrasives stored in hot, dry places may dry out and become brittle, and thus become far more subject to breakage than if properly cared for. Follow manufacturers' instructions, the Council says, on proper storage.

4. Protection that would be used on any machinery should be provided — V-belts, chains, and gears should be covered, as well as couplings and projecting shafts. Motor frames should be grounded.

Additional information on Data Sheet D-452 may be obtained from the *National Safety Council, 425 N. Michigan Ave., Chicago 11, Ill.*

MODERN ARCHITECTURAL DETAILS

N. M. PITTMAN
Leverett's Chapel
Independent School District
Overton, Tex.

Built-in Metal Gutter

In this type of construction there is no soffit material on the overhang. The underside of the roof boards is painted or stained to match the fascia. At the corners there is no rake trim, the end rafters being rabbeted to take the fascia boards, and thus the rafter is also the rake trim. See detail.

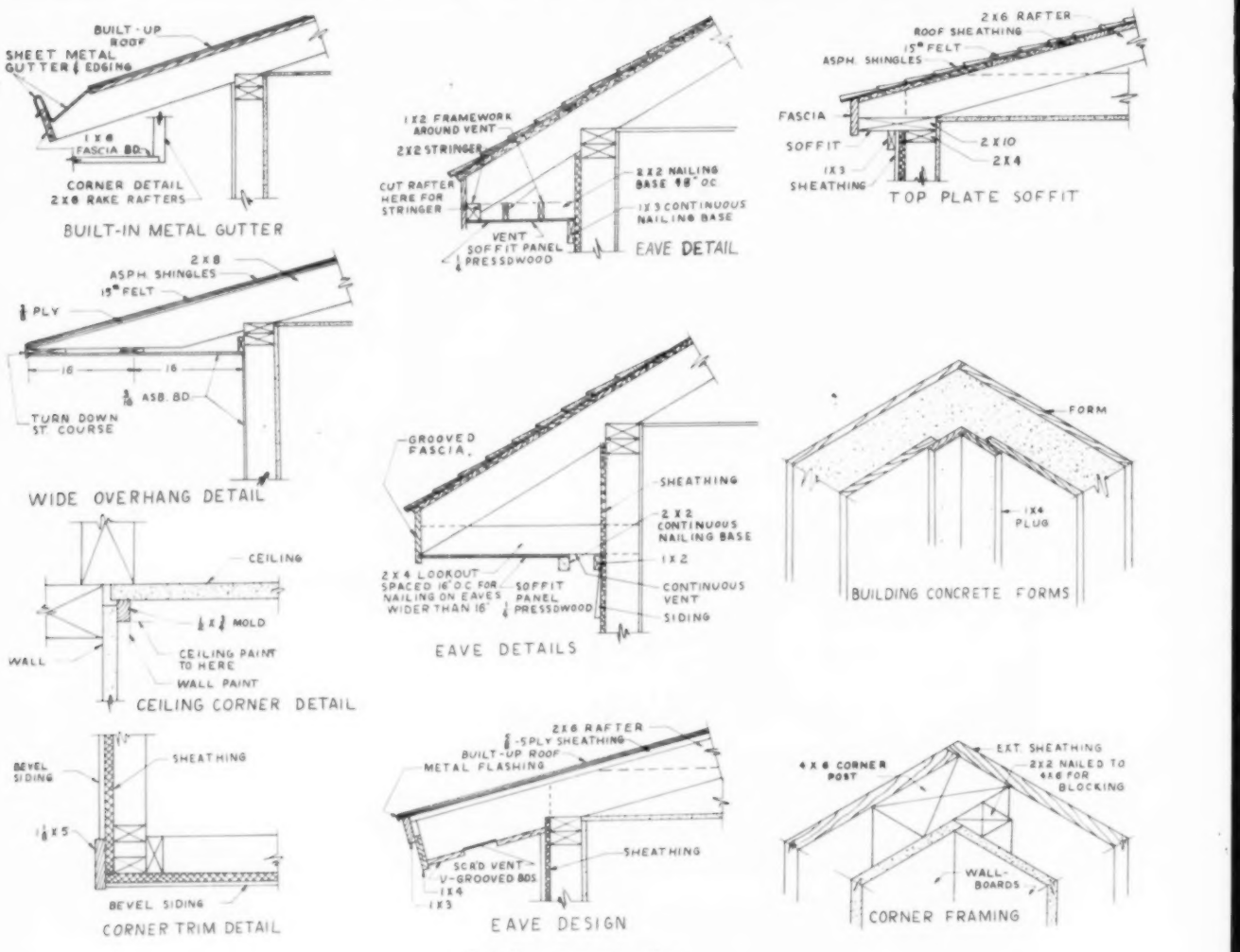
A simple cut on the top of the rafters allows for space for the gutter which, when fabricated by the sheet metal man, is also shaped to provide edging for the built-up roofing. The result is a good-looking eave especially suitable for wide overhangs, and there is a saving in material and labor.

Wide Overhang Detail

A simplified design on an eave section with a 2 ft. 8 in. overhang uses the asphalt shingle starter strip turned down over the edge of the roof. This provides a drip flashing. Just a single horizontal cut is needed on the rafter ends. The 1 by 8, 1 by 4, and 2 by 3-in. blocking provides a level and firm nailing base for the soffit sheets. Rafters are trussed and spaced 2 ft. o.c. and covered with ⅜-in. plywood sheathing.

Ceiling Corner Detail

While some builders are using some sort of crown or cove mold to eliminate taping and cementing ceiling corners, the rectangular parting stop mold is suggested as economical. It also has the added advan-



Details of construction

tage of being easy for the painter in that he will not have to do the trim painting, as in the case where a mold is used.

Corner Trim Detail

The one-piece corner trim board is oversize: 1⅛ by 5 in. This gives a narrow trim edge to one elevation and a broad solid appearance that seems to recess the siding on the other elevation. Siding can be butted and the appearance is greatly improved over the usual lapped corners. There is also a saving in material and labor.

Top Plate Soffit

In the construction of homes with small overhangs, this type of plate-soffit design saves expensive time and material. The 2 by 10-in. top plate acts also as a nailing base for the angled ends of the 2 by 6-in. rafters, and with the addition of the fascia board, becomes a completely enclosed cornice.

Eave Design

In this type of eave design two fascia boards are used, an upper 1 by 3-in. piece overlapping a lower 1 by 4 in. At the roof corners, the 1 by 4 in. returns to the building, boxing in the soffit boards and butting the gable end material. The 1 by 3 in. provides a rake trim also. Ordinary V-grooved boards are used for the soffit, with space left for a continuous screened vent.

Eave Details

Masonite presdwood products are frequently used for soffits on undersides of eaves. Satisfactory results will be assured if the fundamental construction requirements are followed. It is recommended that ¼ or 5/16 in. tempered presdwood be used in this case.

Slightly bevel the surface edges of the panels before applying them, for appearance and for better paint adhesion. Fit the panels loosely, allowing about 1/16-in. gap at all joints. Never force panels into place or butt them tightly in an attempt to secure a smooth unbroken surface. Batten strips may be applied if desired. Provide continuous support in the form of framing members at each edge and end of a panel, and at all joints. Provide lookouts for nailing as shown in the illustrations. Fasten with 5*d*, galvanized box nails, spaced 4 in. apart around all edges and about 6 in. apart at intermediate supports. Do not nail closer than ⅜ in. to edge. Never toe nail this material.

Building Concrete Forms

The sketch shows a method of building concrete forms which makes for ease in removing the forms. Do not join the inside walls at the corners. A plug is made by nailing two 1 by 4 in. edge to edge and is then nailed into the corner. This plug is easily torn out, leaving the ends of the inner walls free. Double-headed nails should be used. This saves tearing up the

material, and it also adds a small amount of strength to the foundation.

Corner Framing

Instead of using the conventional 3-stud corner, some builders use the 4 by 6-in. corner piece as shown in the detail. There is a great deal of time saved as there is only one member, the 2 by 2-in. backer, to be nailed. Another advantage is that one gets a very solid nailing surface for the outside sheathing. And too, this method adds considerable strength to the construction.

SAFETY SWITCH FOR A TABLE SAW

ATHOL R. BAILY
Associate Professor, Industrial Education
University of Washington
Seattle, Wash.
and
ERNEST BATES
John Baker Junior High School
Tacoma, Wash.

With the type of switch so commonly found on the table saws of the present day, the operator frequently finds that it would be very convenient to turn off the power and at the same time be able to have both hands free to handle the material being cut. He finds that fumbling for a switch may create a difficult and dangerous situation. Trying to reach a solution for this problem, Ernest Bates, a former student at the University of Washington College of Education in the industrial-arts area, was assigned the task of designing a switch that would shut off the power and yet permit the operator to have both hands free.

— Photograph by Don Normark

The device shown does not interfere with the workers or the operation of the machine. It does not interfere with the present switch in any way as far as removing the box or replacing the cover. The switch permits the operator to stop the machine by merely touching it with his body. It may be fastened with bolts as shown in the picture, or with self-tapping screws, or it may be riveted to the cover. Fastening it with screws or bolts permits removing the cover, if necessary, with a minimum of effort.

GRAPHIC ARTS TEACHING AID

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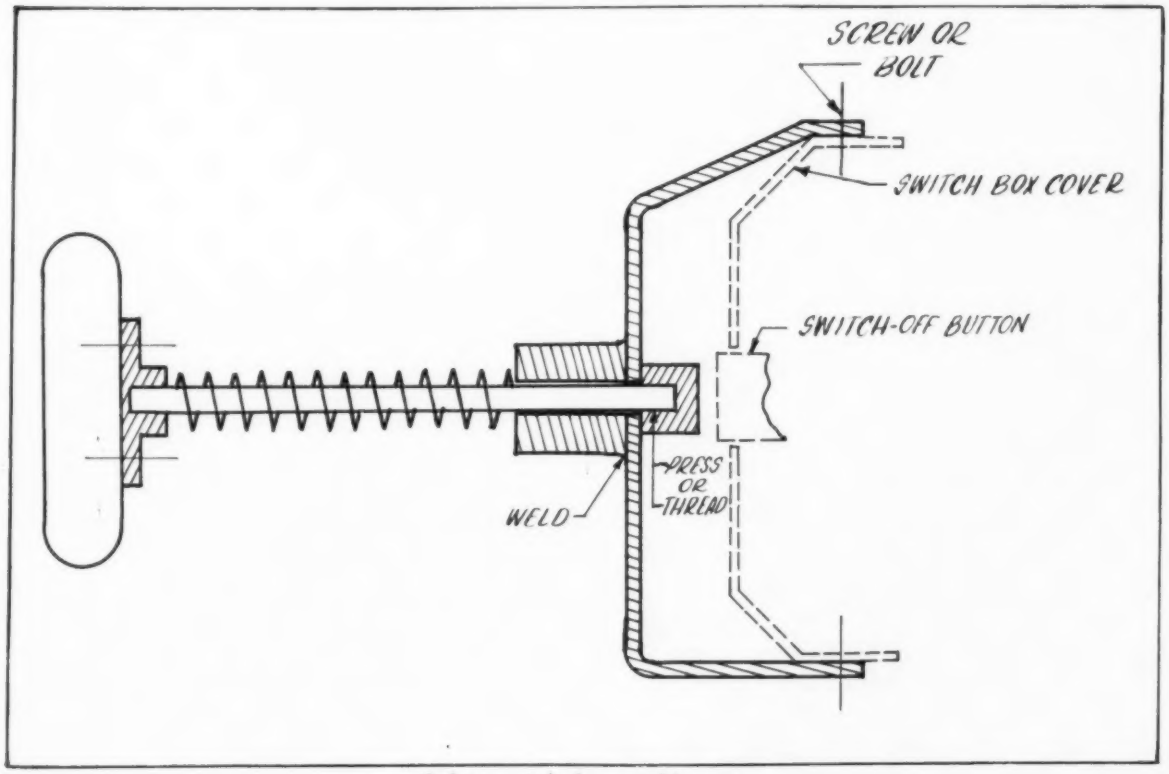
Industrial Arts Division
State University of New York
College of Teachers
Buffalo, N. Y.

The teaching aid, shown herewith, illustrates the black and white dot formation which makes up the half-tone process. If it is viewed from approximately 75 ft., the dots will blend together, resulting in a huge eye looking down at the viewer.



Safety switch for a table saw

— Campus Studios, State of Washington

Graphic arts teaching aid by Donald G. Brossman

This was reproduced by a first year graphic arts student using a shop-made photoengraver's camera and was printed on a model 1250 multilith.

WHY NOT MARK DRAWINGS THE NEAT WAY?

LAWRENCE THEMMES
Drafting Instructor
Johnson High School
St. Paul, Minn.

Have you ever graded and returned to a student a once-neat drawing disfigured and not displayable because of red pencil corrections and comments? Psychologically, the effect upon the student after seeing his efforts so mutilated is usually one of discouragement rather than inspiration. This needless psychological obstacle can be easily removed by providing special spaces for marking in the title strip of the drawing.

This method, as is illustrated in the accompanying illustrations, will enable you to confine your correction comments to the boxes provided. The only marks you need make on the drawing paper are miniature symbols to indicate points of error. See Figure 1. Small circles for focusing the students' attention on open corners and overlapping lines, plus tiny checks to indicate all remaining errors, are used in the sample drawing, but any desired set of symbols will prove equally satisfactory. A drawing corrected in this way and marked in accordance with your own favorite method for scoring points will prove to be a most desirable combination of neatness and simplicity, as shown in Figure 2.

The first thing to be carefully defined is the list of four words which your students are to letter into the title strip for your marking convenience. These words are *lines, dimensions, lettering* and *appearance*. An outline of factors which you should consider when marking each aspect of a drawing is as follows:

Lines
1. Check for deviations from alphabet of lines.
2. Check for overlapping lines or open corners.
3. Check for fuzzy or nonsharp pencil lines.

Dimensions
1. Check for missing arrow heads.
2. Check for incorrect dimensions.
3. Check for violation of rules for dimensioning.

Lettering
1. Check for wrong case letters.
2. Check for missing guide lines.
3. Check for misspelled words.

Appearance
1. Check for smudges and erasures.
2. Check for incorrect placement of views, centering, and balance.

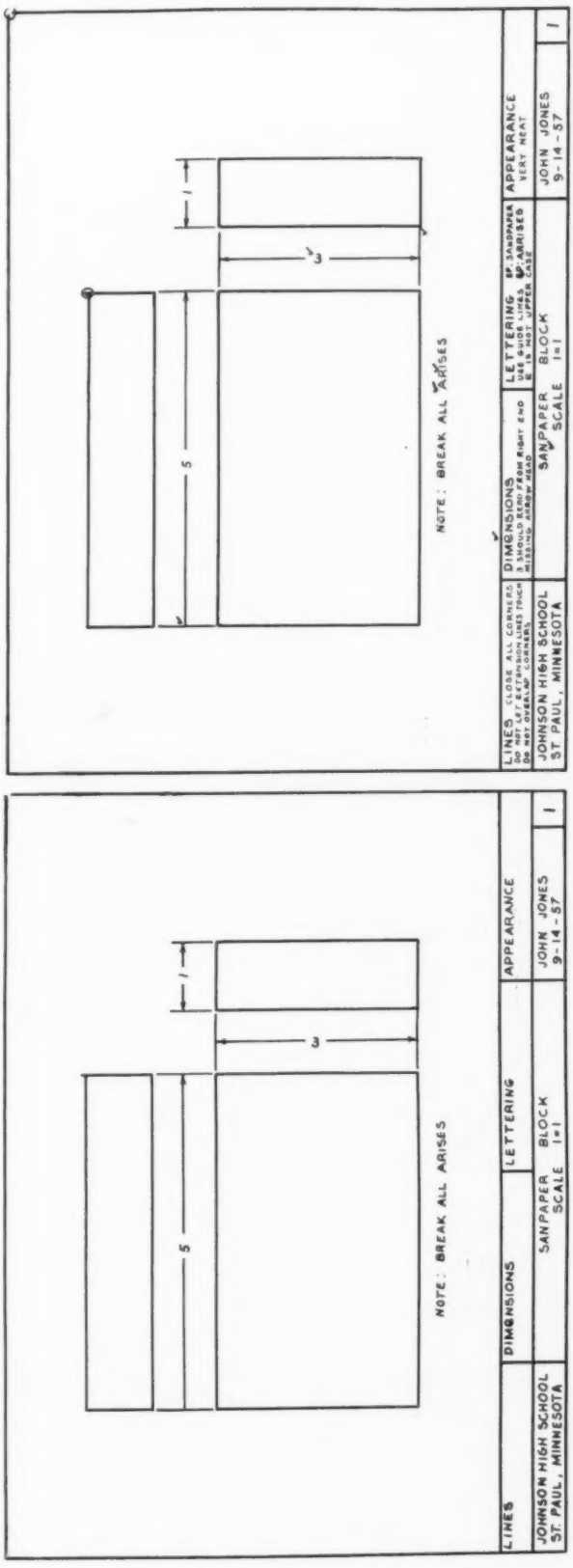


Fig. 1 (at left). A typical drawing turned in by a student to his instructor for correction. Note how the title strip is lettered by the student in preparation for the neat insertion of correction comments by the instructor. Fig. 2 (at right). The same drawing as it appears after correction by the instructor. Note how, on the drawing itself, certain errors are pinpointed within the miniature circles and how unobtrusively miniature checks indicate the remaining points of error. When a student is deserving of praise for work well done, a few complimentary words placed in the appropriate box will add to the effectiveness of this grading method and will greatly encourage that student

3. Check for bent corners, tears, or other signs of abuse.

By and large, the categories in the preceding outline should encompass the errors which will be found in any drawing that you will encounter. Even a very occasional error which, at first glance, does not seem to fit into the four categories of mistakes will, upon closer observation, be seen to have sufficient relationship to a category to be legitimately listed in one of the four boxes.

You expect neat drawings from your students. Why not show them the same courtesy and return their drawings neatly and systematically corrected? You will be well rewarded for your thoughtfulness when you see the pride which your students can still take in drawings corrected by this method.

ALL PURPOSE CIRCUIT TESTER

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Principal
Belding Elementary School
Chicago, Ill.
Formerly Instructor of Electricity and Radio
Carl Schurz High School
Chicago, Ill.

In teaching electric shop or radio shop, a teacher must keep in mind the fact that students have to learn circuitry well. The student has to be able to trouble-shoot circuits, find the difficulty, repair the trouble so that the entire electronic device will operate. Visual inspection of the circuit will sometimes uncover the difficulty, but not too often. It is more often necessary to use some type of testing device, usually an expensive electrical meter. Because of this, the electronics teacher finds himself in a dilemma. He wishes to have his students test the circuits of electrical devices as soon as possible, but he is reluctant to place expensive equipment into the hands of inexperienced young people.

This project will help the teacher solve this dilemma. The writer has found that after the students have made the circuit tester and learned how to use it properly, they will often reject the expensive equipment as being too slow or too cumbersome for their needs. Each student may make this tester as his first electric or radio shop project, as it can be used to test all dead or live circuits within the range of the everyday living experiences of the students.

The all purpose circuit tester can be used as a continuity tester on dead circuits, or as a live voltage tester for any voltage from 2.5 volts to 550 volts, either on direct or on alternating current. This versatility can be achieved by the use of the various component parts that the students make.

As an introduction to the making of the circuit tester, the class discusses, in general, electric devices and their failure to operate. The discussion is directed by the teacher toward the electrical interests of the students. After interest is developed in trying to find out why electronic devices fail to work, the instructor demonstrates the use of the tester on actual electrical items. When this preparation is completed, most students are very eager to start the project. They are cautioned that the success of the tester's operation depends upon the accuracy of their work, their attention to detail, and their interpretation of the results.

The students also make a small wooden container so that all of the component parts of the tester may be kept together. The bill of material, drawings, specifications, assembly, and instructions for making and using the tester follow.

BILL OF MATERIAL

Item No.	*No. Req.*	*Name of Part*	*Material and Size*
1	1	Socket shell	½ O.D. x 5/16 brass tube
2	1	Socket	7/16 O.D. x 5/16 brass tube
3	1	Probe	No. 14 copper wire, 2 in. long
4	1	Body tube	5/8 O.D. x 4½ fiber tube
5	1	Conductor tube	3/8 O.D. x 3 3/8 gray fiber tube
6	1	Resistor tube	3/8 O.D. x 3 3/8 red fiber tube
7	4	Ends	¼ dia. x ½ brass rod
8	1	Spring disk	16 ga. copper x 7/16 dia.
9	1	Contact disk	16 ga. copper x 7/16 dia.
10	1	Spring	16 ga. spring wire, ¼ dia. x 3¾ long
11	1	Rear plug	5/8 dia. x ½ plastic rod
12	1	Conductor wire	16 ga. copper wire, 3¾ long
13	1	Resistor	220,000 ohm carbon resistor
14	1	Test leads	No. 20 flexible wire, 16 in. long
15	1	Crocodile clip	No. 85 Mueller
16	1	115 volt bulb	N E-51, neon glow lamp
17	1	6 volt bulb	No. 47 lamp, blue bead
18	1	2.5 volt bulb	No. 43 lamp, white bead
19	2	Batteries	No. 7 Burgess, 1½ volts
20	1	Probe insulator	1¾-in. rubber insulation of No. 14 copper wire
21	1	Clip insulator	No. 87 Mueller
22	2	Container sides	3/16 x 1 5/8 x 8¾ wood
23	1	Container front end	3/16 x 2½ x 1 3/8 wood
24	1	Container back end	3/16 x 2½ x 1 5/8 wood
25	1	Container bottom	1/16 x 2 7/8 x 8¾ fiber
26	1	Container cover	1/8 x 2 5/8 x 8½ masonite
27	1	Bulb holder	¾ x ¾ x 4 wood

Construction Details

Socket Shell — See item 1, Figure 1. File one end square. Cut slightly oversize and file square to length. Use a dowel inside the tubing to prevent crushing the tube. Remove all burrs, inside and out.

Socket — See item 9, Figure 1. File one end square. Make a center line on tube. Measure 7/32 in. from end and centerpunch. Make a centerpunch mark 5/32 in. to the left of first mark. Using a 5/64-in. drill, carefully drill through the diameter of both centerpunch marks. Take a hack saw with two blades, and carefully cut a slot from the top of the tube to the first drilled hole. Using a small die cut file, smooth all edges and test to see that the bayonet based bulb fits into the socket properly. Cut slightly oversize and file end square. Remove all burrs. Make sure that the wooden dowel is inside the brass tube when performing the above operations.

Probe — Item 3, Figure 1. Cut wire slightly oversize. File ends square. Tin both ends with solder.

Probe and Socket Assembly — Tin outside of socket with thin layer of solder. Slip socket into shell and heat shell on the outside. This will solder both pieces together. Halfway between solder slots, file shallow groove in the shell. Fill this with solder. Place probe in place and solder. Be sure that probe faces the bulb opening.

Body Tube — Item 4, Figure 1. File one end square, cut slightly oversize and file other end square to size. File a 7/32-in. slot for probe. Carefully and slowly cut a 9/16-in. — 18 thread in the other end of the tube for the indicated distance, Figure 1.

Body Tube Assembly — Glue probe and socket assembly into the body tube. Allow to dry overnight.

Probe Insulator — Remove the rubber insulation carefully from a section of No. 14 copper wire. Cut insulation to size and slip onto probe so that ¼ in. of the probe extends beyond the insulation.

Conductor Tube — Item 5. Use gray tube, following standard tubing procedure described above. In ink, neatly letter, *CONDUCTOR TUBE* on this tube.

Resistor Tube — Item 6. Use red tube, following standard tubing procedure described above. In ink, neatly letter, *RESISTOR TUBE — 115 VOLTS* on tube.

Ends — Item 7. Cut four pieces slightly oversize. File square and to length. Carefully drill a 1/16 in. hole throughout the length of each.

Conductor Tube Assembly — See Figure 2. Solder one end of conductor wire into brass end piece. Force this end into conductor tube allowing 1/16 in. to protrude. Slip other brass end piece onto conductor wire, force second end into tube also allowing 1/16 in. to protrude. Solder wire to end piece.

Resistor Tube Assembly — Figure 2. Same procedure as conductor tube assembly, except that the resistor is used instead of a piece of wire.

Spring Disk — Centerpunch material and punch 7/16 in. diameter disk with the bench Whitney Punch. Use the 3/16 in. hand Whitney Punch and make a hole in the center of the disk. Clean thoroughly.

Contact Disk — See Figure 1. Same instructions as spring disk, except that a 1/16-in. Whitney Punch is used instead of the 3/16-in. punch.

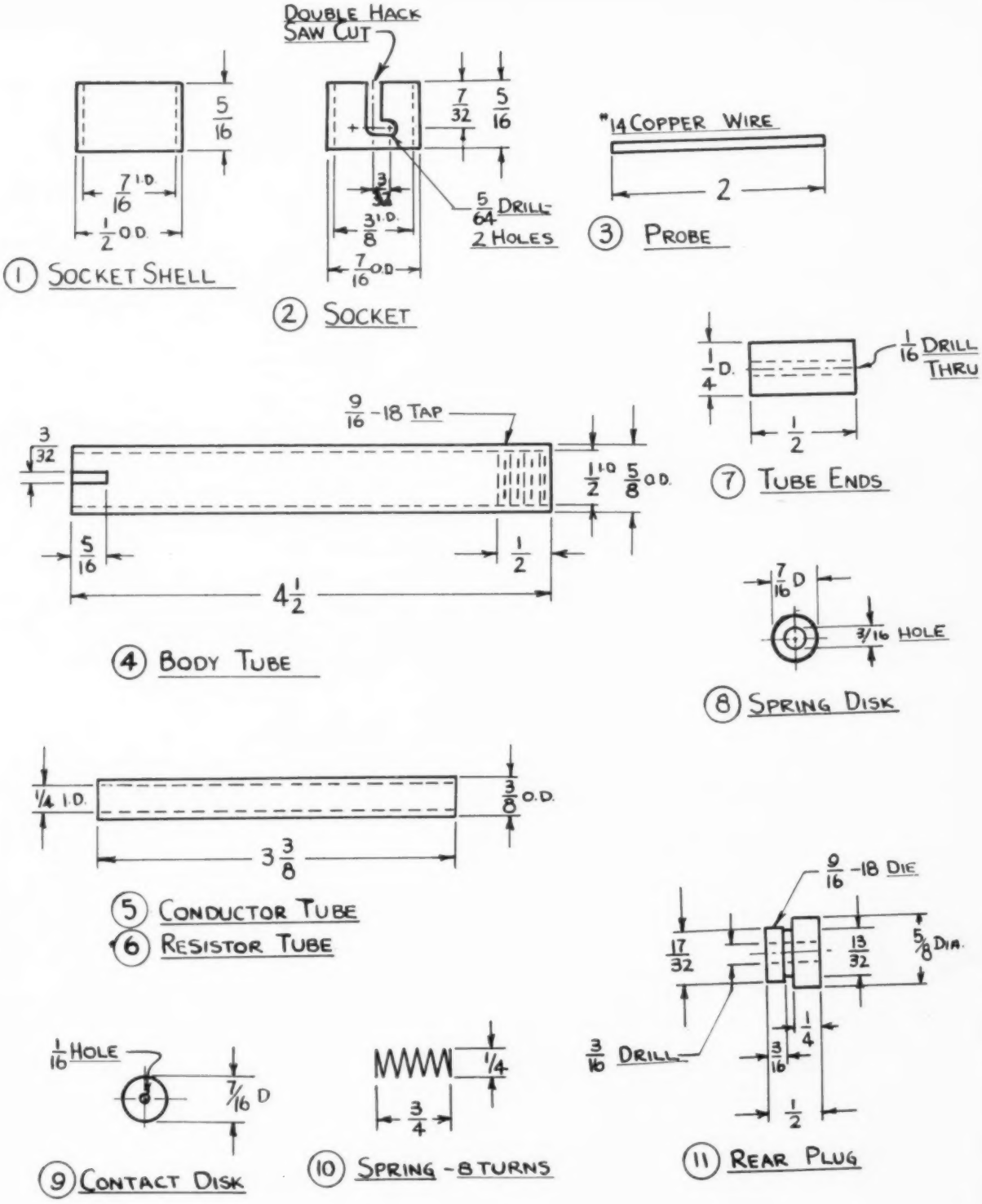

Fig. 1. Details of circuit tester parts

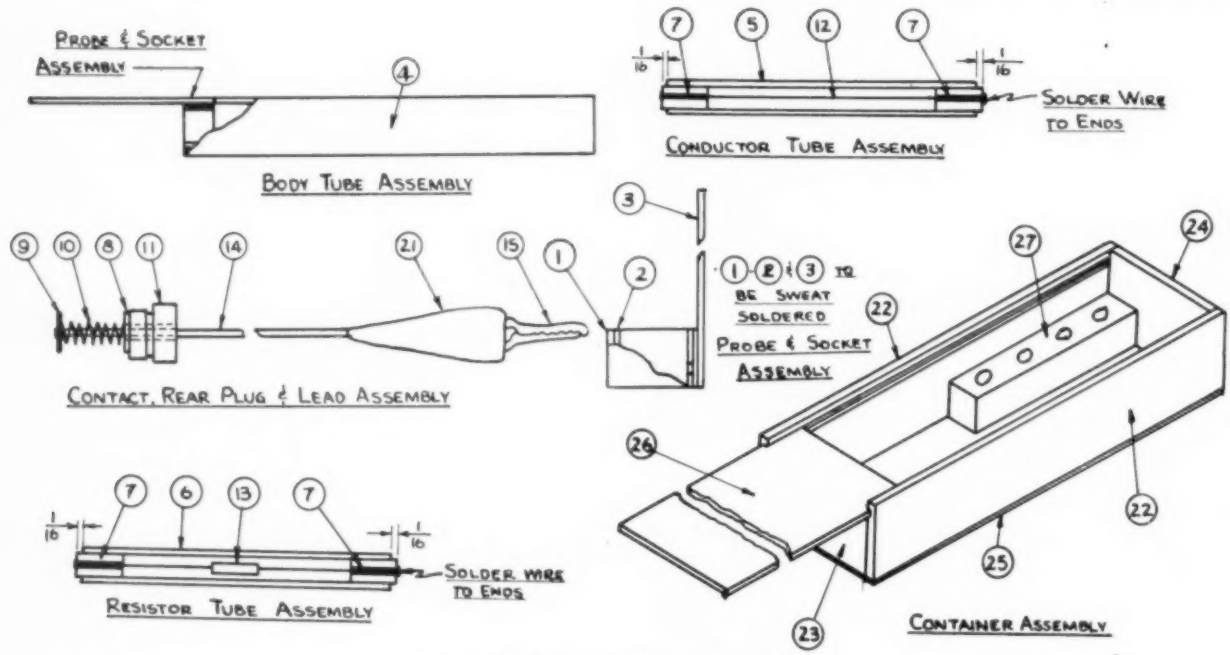
PROBE & SOCKET ASSEMBLY
BODY TUBE ASSEMBLY
CONDUCTOR TUBE ASSEMBLY
SOLDER WIRE TO ENDS
CONTACT, REAR PLUG & LEAD ASSEMBLY
1-2 & 3 TO BE SWEAT SOLDERED
PROBE & SOCKET ASSEMBLY
RESISTOR TUBE ASSEMBLY
SOLDER WIRE TO ENDS
CONTAINER ASSEMBLY

Fig. 2. Details of different assemblies

Spring — See Figure 1. Wind spring on ¼-in. diameter rod. Stretch spring out to the required length and flatten out the last on both ends.

Rear Plug — See Figure 1. On the machine lathe, turn the plastic rod to the dimensions given in the drawing. The smallest diameter — 17/32 in. must be at the end of the rod. After the rod is turned to size, cut a thread on the end with a 9/16-in. — 18 die. Be sure to start the die straight. Replace the plastic rod in the lathe, drill

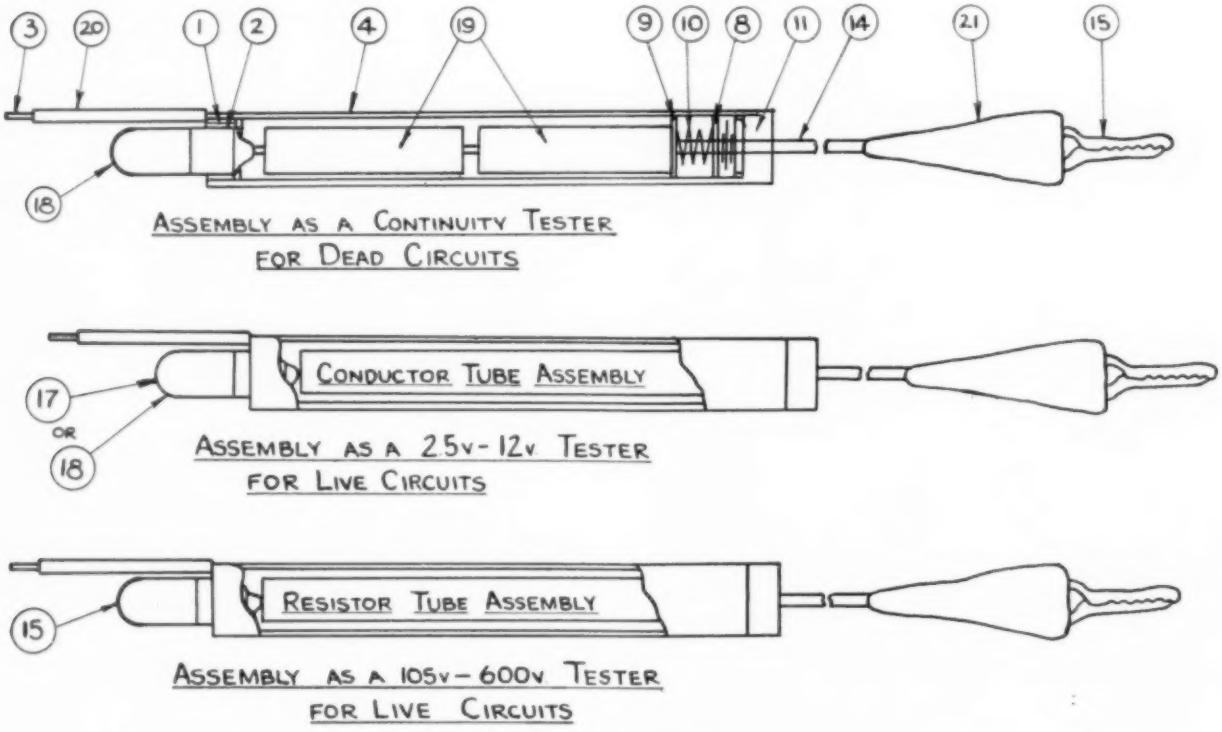
ASSEMBLY AS A CONTINUITY TESTER FOR DEAD CIRCUITS
CONDUCTOR TUBE ASSEMBLY
OR
ASSEMBLY AS A 25v-12v TESTER FOR LIVE CIRCUITS
RESISTOR TUBE ASSEMBLY
ASSEMBLY AS A 105v-600v TESTER FOR LIVE CIRCUITS

Fig. 3. Tester assemblies

the remainder of the rod with the cutoff tool. Screw into body tube to check accuracy. Countersink rear of hole to prevent wear on the lead wire.

Rear Plug and Contact Assembly — See Figure 2. Solder end of test lead wire to contact disk. Slip spring, spring disk, and rear plug on the wire from the opposite end. Screw into body tube to check the assembly of unit.

Container — See Figure 2. Cut and assemble as shown in drawing. Holes in bulb holder are to be drilled ⅜ in. deep. The diameter of the holes should allow for a snug fit so that the bulbs will not fall out. After assembly, the container should be sanded, shellacked, and waxed.

Instruction Sheet — Following the directions on the instruction sheet, assemble the tester for each of the three different types of circuits as shown in Figure 3. Learn the purpose of each part, and be able to explain how the tester is to be used for any given situation.

Instruction Sheet on Use of All Purpose Circuit Tester

Important Note: Any tester can only show two indications. The bulb may light or it may fail to light. Either one of these situations may mean that the circuit is good, bad, open, or shorted. It is *your* interpretations under the existing testing conditions that will actually tell you what is wrong with the circuit, and from this you will be able to proceed to make the proper repair.

I. To Use Tester for Dead Circuits — Figure 3

Assembly — Place No. 43 bulb (2.5 volts) in socket. Insert batteries so that center post of batteries point toward the bulb. Screw in rear plug assembly, Figure 2.

To test — Be *sure* that the item you are testing *is not* plugged into any source of electricity. Tip of probe should be placed at one end of circuit and clip should be placed on other end of circuit. Bulb will light if circuit shows continuity or is shorted. Bulb will not light if there is a break, open, or high resistance in the circuit.

Assembly as a tester for high live circuits

II. To Use Tester for High (105-600 v.) Live Circuits. See Figure 3.

Assembly — Place NE-51 bulb in socket. Insert resistor tube assembly and then screw in rear plug assembly.

To test — The circuit under test, *must* be plugged into the proper source of electricity. Tip of probe and clip must be placed at opposite ends of circuit, or portion of circuit under test. Bulb will light if there is electrical continuity, or if there is a short. Bulb will fail to light if there is a break, open, or high resistance in the circuit. If both prongs in bulb glow, then the circuit under test has alternating current; if only one prong in bulb glows, then the circuit under test has direct current. Intensity of glow will indicate the approximate voltage of the circuit.

Assembly as a tester for low live circuits

III. To Use Tester for Low (2.5 v.–12 v.) Live Circuits. See Figure 3.

Assembly — Place proper bulb for voltage under test into socket. Insert conductor tube assembly into tester and screw in rear plug assembly.

To test — The circuit under test *must* be plugged into the proper source of electricity and the proper bulb voltage must be used. Tip of probe should be placed at one end of circuit and clip should be placed on other end of circuit. If power is present bulb will light. If power is not present bulb will fail to light. Bulb will also light if there is continuity, and will not light if there is an open or high resistance.

Battery Chart

The following batteries are interchangeable with Burgess No. 7: EverReady No. 912, General No. 901, Ray-O-Vac No. 400, RCA No. VS074.

Bulb Chart

The following bulbs may be used to test live circuits for the indicated voltage. The tester is assembled for low voltage live circuits.

Bulb No.	*Volts*	*Bulb No.*	*Volts*
49	2	1815	12–16
43	2.5	1488	14
45	3.2	313	28
1490	3.2	1820	28
44	6–8	1829	28
47	6–8		

TYPICAL SPECIFICATIONS FOR A RESIDENCE — II

N. M. PITTMAN

Leveretts Chapel High School

Overton, Tex.

(Continued from page 335 of the December, 1957, Industrial Arts and Vocational Education)

Rafters: Rafters of size noted on plans shall be one of the following:

1. No. 2 or btr. Douglas fir S4S
2. No. 2 or btr. Southern yellow pine S4S

Rafters shall be cut level so as to secure full bearing on the wall plates and shall be securely spiked to plates and ridge.

Subflooring: Cover floor joists throughout the house with one of the following:

1. 1 by 6 in. and wider No. 3 or btr. Douglas fir
2. 1 by 6 in. and wider No. 3 or btr. yellow pine

Lay flooring diagonally face nailing to each joist with 8*d*. nails. All end joints to be broken and laid over center of joists. In applying end-matched flooring, face nail with 8 *d*. nails and lay so that adjacent pieces to an end-matched joint shall span at least two joists.

Wall Sheathing: Cover all exterior walls with one of the following:

1. 1 by 6 in. and wider No. 3 or btr. Douglas fir
2. 1 by 6 in. and wider No. 3 or btr. yellow pine

Lay sheathing at an angle of 45 deg., face nailing to each stud with 8*d*. nails and break all joints.

Roof Sheathing: Cover rafter with one of the following:

1. 1 by 6 in. and wider No. 3 and btr. Douglas fir
2. 1 by 6 in. and wider No. 3 and btr. yellow pine

Lay sheathing at right angles to the rafters, face nailing to each rafter with 8*d*. nails and break all joints.

Building Paper, Deadening Felt: Cover wall sheathing with slaters' felt properly lapped. Before finish floors are laid, cover subfloor with red-rosin building paper or 1 lb. deadening felt.

Insulation: Apply Standard Balsam-Wool between studding of all exterior walls and Double-Thick Balsam-Wool on all ceiling joists, leaving an air space on each side of the insulation. Flanges of the insulation to be stapled to studs and ceiling joists. See details on plans.

Dampproofing: In areas requiring control of humidity in the crawl space, furnish and lay 55 lb. roll roofing on ground over entire area inside foundations, lapping sheets 3 in.

Roof Shingles: Cover roof with 16 in. No. 1 "Certigrade" Western Red Cedar Shingles laid with exposure shown in the working drawings. All shingles shall be nailed with hot dipped zinc coated nails.

Garage Roof: As above.

Siding: Cover exterior walls with one of the following:

1. ¾ by 10 in. Western red cedar bungalow siding, *A* grade
2. ¾ by 10 in. Southern yellow pine bungalow siding, *C* or btr.

Paint back of siding and allow to dry before erecting. Nail, with nails that will not permit staining, securely to each stud and do not use boards less than 8 feet in length.

Exterior Trim and Moldings: Install cornice, frieze, rakes, louvers, and trim for window and doors of one of the following:

1. C or btr. Douglas fir
2. D or btr. Ponderosa pine
3. C or btr. Southern yellow pine

See drawings and details on plans.

Frames, Sash, and Screens: Door and window frames shall be of standard types, made by reputable manufacturers. Window frames to be complete with sills, casings, and blind stops. All double hung sash to be 1⅜ in. thick with 1⅛-in. storm sash and screens, screens to be of 14 mesh galvanized wire. Windows and storm sash to be glazed S.S., exterior doors, D.S.

Calking: Calk around top, sides and underneath all window and door frames.

Doors: Doors to be of sizes, thickness, and design shown on the drawings and shall be of standard make and stock pattern. Exterior doors to be 1¾ in. thick, all hinged interior doors to be 1⅜ in. thick. Provide combination storm and screen doors for front, terrace, and rear entrances.

Finished Floors: All floors except kitchen and bathroom shall be of 13/16 by 2¼ in. face, select grade oak. Kitchen and bathroom floors shall be one of the following:

1. ⅝ by 4 in. FG Douglas fir flooring, D or btr.
2. ⅝ in. Plyscord C-D Douglas fir plywood

Flooring to be well nailed to receive linoleum. Finished floors to be machine sanded and left clean for finishing.

Linoleum: Kitchen and bathroom floors and kitchen counter tops shall be of standard gauge linoleum, pattern as selected by the owner and installed strictly in accordance with the manufacturer's specifications. Counter tops shall be carefully fitted and cemented with waterproof cement. Sink to be set flush with counter top and metal edging applied to edge of linoleum at sink and along edge of counter top.

Interior Trim and Cabinet Work: Standing and running trim and cabinet work shall be one of the following:

1. C or btr. Ponderosa pine
2. C or btr. white pine

All material shall be delivered at the building after the plaster has dried. Set all nails for puttying. Install all cabinet work neatly and securely as shown in the details.

Rough Hardware: The contractor shall furnish all rough hardware of every description, such as nails, screws, mechanical balances, bolts, anchors, etc.

Finish Hardware: Allow the sum of $100 for the purchase of finish hardware to be selected by the owner and installed by the contractor. Front, terrace, and rear entrance doors shall have solid brass mortise 3 tumbler lock sets. Outside doors shall be hinged with 3 4 by 4-in. mortised steel butts. Inside doors shall be hinged with 2 3½ by 3½-in. mortised steel butts.

Sheet Metal: The work under this section shall consist of furnishing and installing all the sheet metal work shown or specified. All flashings, counterflashings, ridges, termite shields, etc., shall be of No. 26 gauge galvanized iron. All sheet metal work shall be primed with red lead before being installed. Flash around chimney, vent stacks, roofs, and over all window and door openings. Gutters and downspouts shall be 4-in. galvanized iron rectangular sections secured with galvanized iron bands. Install termite shields as shown in the details.

Lath and Plaster: Lath all walls, partitions, and ceilings with No. 1 wood lath or gypsum plaster base. Lath all angles in walls and ceilings with a 6 in. angle-shaped strip of metal lath. All external angles shall have metal corner beads. Plaster all walls, ceilings, and partitions with a standard brand of fresh, hard wall plaster. Wood lath shall be thoroughly soaked before applying plaster. Final finish coat shall not be applied before base coats are thoroughly dry. All plaster shall be rodded straight with sharp angles and true surfaces. All plaster work shall be of three coats. Keene cement finish shall be used in the bathroom and the heater space. All other plastering to be trowel finished.

Painting and Finishing: The work under this section shall consist of furnishing and applying all materials and performing all necessary labor to do all the painting and finishing of all exterior and interior woodwork, all walls, ceilings, wood floors, and sheet metal shown or specified. The owner shall select colors and finishes desired and furnish the contractor with a written schedule of exterior and interior painting and finishing before painting work is started.

All paints, varnishes, enamels, stains, and similar materials shall be first quality products of a manufacturer whose reputation is well known and the quality of whose products is unquestioned. All materials shall be delivered to the job in original containers and used in strict accordance with the manufacturers' directions. Undercoats of paint and enamel shall be of the same or approximate color of the final coat.

No paint shall be applied on surfaces that are not thoroughly clean and dry. All coats of finish shall be bone dry before the application of succeeding coats. Before priming, seal all knots, sap or pitch streaks. All rust, grease, and erection marks shall be entirely removed from surfaces to be finished. All nail holes shall be puttied after priming.

All exterior trim shall be painted 3 coats according to standard practice, well brushed on. Exposed sheet metal shall be painted two coats to match the house in addition to the priming coat.

The interior woodwork shall receive two coats of undercoating and one coat of enamel, sanded lightly between coats.

Oak floors are to be finished with one coat of paste filler, one coat of oil stain (omit stain if natural color is desired), and two coats of floor varnish, gloss or dull finish, sanded lightly between coats.

Electric Wiring: The work under this section shall consist of furnishing and installing all equipment and material and performing all necessary labor to provide a complete system of electric wiring from the electric service entrance on the outside of the house to each and every outlet shown on the plans ready for operation. Wiring shall be installed in strict accordance with the latest rules and regulations of the National Board of Fire Underwriters and rules of the local electric company. All devices and materials used shall conform to the current National Electric Code.

Switches shall be tumbler type and wall receptacles shall be duplex type, all with bakelite plates.

Allow the sum of $100 for lighting fixtures to be selected by the owner and installed by the contractor.

Plumbing: The work under this section shall consist of furnishing all material and equipment and performing all labor necessary to install and connect with the water supply system, sewer (or septic tank) and gas in street all fixtures shown on the plans or specified herein. Furnish and install all gas piping and hot water system. Before starting work the contractor shall obtain all necessary permits and pay all charges for same. All charges or deposits for meters will be paid by the owner. The contractor shall install all piping, connections, and supports necessary for the placing of meters in accordance with local rules and regulations. All piping shall be concealed in partitions or walls.

All fixtures shall be of size specified, of good manufacture and free from any defects in material and workmanship. All water and vent piping shall be standard galvanized steel pipe of proper size. All gas pipe to be standard steel pipe with malleable iron fittings. Install 2 sill cocks on the outside of the house where shown on the plans. Place a compression stop and waste cock on each branch to outside sill cocks. Furnish and install piping to water heater, run supplies to clothes washer, to kitchen sink, to bathtub and lavatory. Carry downspouts to concrete splash blocks extending 4 ft. from building line, or connect to sewer.

Install and connect adequate size and approved design septic tank where sewage facilities are not available. The contractor shall guarantee the drainage, plumbing, and gas fitting work against all defects of material and workmanship for a period of 12 months from date of final acceptance.

Special Items Included

The general conditions of the specifications apply to this section.

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.....

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Approved:

..... *Owner*

..... *Owner*

Date .....

Approved:

..... *Contractor*

By .....

Date .....

The End

MODERNISTIC WASTEBASKET

ASH BARTO
Instructor, Industrial Arts Dept.
Junior High School
Bay Shore, N. Y.

Although this particular project keeps its operations within the traditional procedures and methods of the sheet metal tools and machinery such as the slip roll former, the turning, wiring and burring machines, its contemporary design offers something new and more vitalizing than the usual and time weary measuring cup, scoop, or funnel to the student as a finished product.

The materials used for its construction may be IC tinplate, or 28-guage black or galvanized iron, for the container or body and $^{3}/_{16}$ in. diameter, hot rolled mild steel for the frame. Brazing rod could be used; however, cost in most cases makes its use prohibitive.

The operations involved are many and diversified, including: the use of layout tools, squaring and tinner's shears, files, hack saw, the bar folder, slip roll former, turning, wiring and burring machine, the setting down of the double-seam and wired edge, and finally the selection and application of a desirable finish.

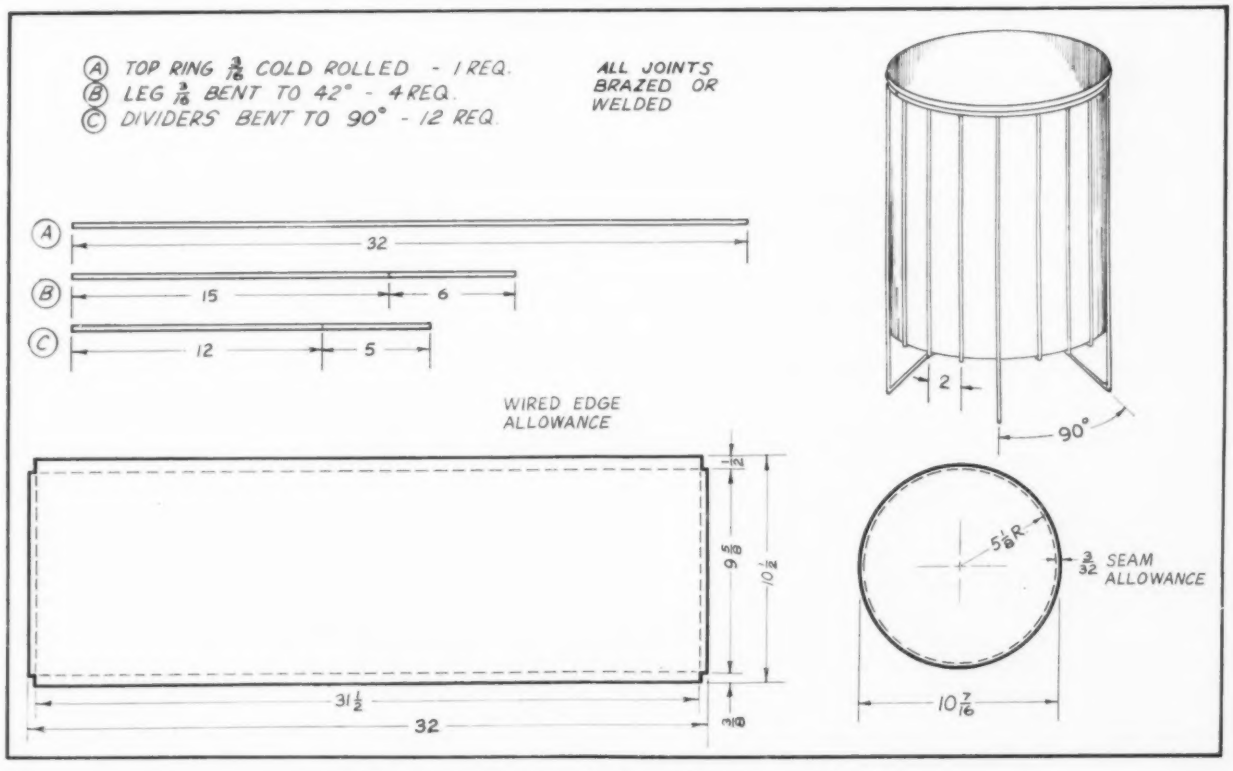
After the particular material has been selected, in this case, 28-guage black iron, cut one piece to a dimension of $10^{1}/_{2}$ by 32 in., which shall be the body or the container and cut another piece of the same stock to a circle of $10^{7}/_{16}$ in. diameter which should be used for the bottom.

The next step would be to lay out across the top edge of the body, $^{1}/_{2}$-in. allowance for the $^{1}/_{8}$-in. wired edge and $^{3}/_{8}$-in. double seam allowance across the bottom. The sides will receive $^{1}/_{4}$-in. double seam allowance. Actually, the top and bottom dimensions are cut oversize, larger than the required wired edge and seam allowance, to prevent their binding with the double seam running up the edge and joining the two ends together in their final assembly.

After the two pieces have been cut to the finished dimension, filed and checked for accuracy, we can set the bar folder to $^{1}/_{4}$-in. capacity and fold the edges in preparation for the double seam. Adjust the slip roll former to the proper tension, and roll the body to the diameter given. Then remove the body and join the double seam allowance, setting it down on the double seaming stake and then finish it off with the seaming tool.

The wired edge is prepared by setting the wiring machine to the proper adjustment, two and one half times the diameter of the wire used, and turning a seat for the wire across the top edge of the body. Place the wire, which has been formed to the same diameter as the body, into the seat just turned and starting at the end, where the wire projects, turn the edge over with a pair of pliers, locking the wire in place. Set the gauge on the wiring machine and set down the material over the wire, rotating the cylinder while turning the machine. This operation may be repeated with added adjustment to the machine for a tight and uniformly finished job.

For completing the bottom double seam, the first operation would be to turn a burr on the $10^{7}/_{16}$-in. diameter disk. Set or adjust burring machine to proper dimension and run the bottom through. When this operation is completed turn an edge on the body and join the two pieces, bottom and body, together. Use the setting down machine,



Details of construction of the modernistic wastebasket

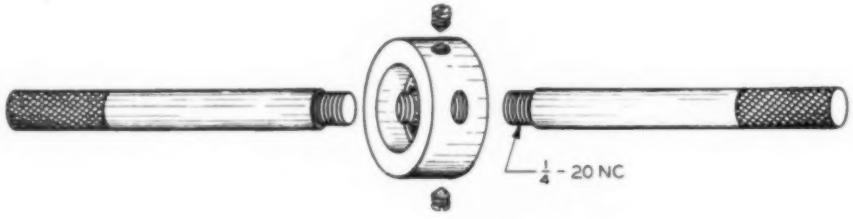
or if none is available, use the hand method with the bench stake to finish the double seaming operation.

For the present we are finished with the body of the wastebasket and can start our modernistic frame which holds the basket in place and off the floor.

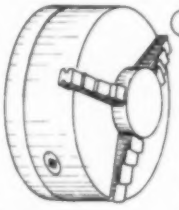
As mentioned previously, the material used is $\frac{3}{16}$-in. diameter, hot rolled, mild steel. One piece, 32 in. long will be formed to a circle and act as the top of the frame. Four pieces, cut to 21 in. and bent to 42 deg. 6 in. from the edge, will act as the legs and will be spaced at 90 deg. around the circular top. In between these legs, equally spaced will be the dividers, illustrated in the drawing as 17 in. long and bent to 90 deg. 5 in. from the end.

It may be necessary to enlist the aid of a jig or frame to facilitate ease and accuracy in holding these pieces in place while the brazing or welding operation is being accomplished. Two pieces of ½-in. plywood cut to the inside diameter of the circle with notches cut at the proper places around the circumference to accommodate the legs and dividers will do the job satisfactorily. After the legs have been located in these notches, wire is then securely fastened around the outside frame

DIE HOLDER



① SECURE A PIECE OF $1\frac{3}{8}$ DIAMETER C.R.S. $\frac{11}{16}$ LONG.



② INSERT IN LATHE CHUCK.

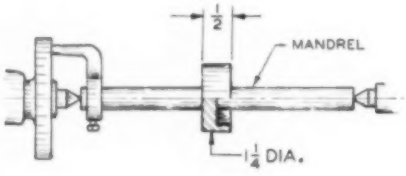
③ FACE END WITH CUTTING TOOL.

④ CENTER DRILL.

⑤ DRILL $\frac{1}{4}$ HOLE THROUGH.

⑥ OPEN HOLE TO $\frac{5}{8}$.

⑦ CUT OPENING FOR DIE $\frac{13}{16}$ DIAMETER AND $\frac{1}{4}$ DEEP.



⑧ PLACE ON MANDREL AND CUT TO FINISHED SIZE.

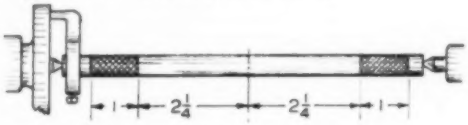
⑨ FILE AND POLISH WITH FINE ABRASIVE CLOTH.

⑩ LAY OUT, DRILL, AND TAP HOLES FOR HANDLES AND SETSCREWS.

⑪ SECURE A PIECE OF $\frac{3}{8}$ DIAMETER C.R.S. 8 INCHES LONG FOR HANDLES.

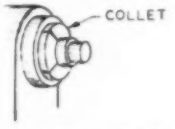
⑫ CENTER DRILL AND MOUNT BETWEEN LATHE CENTERS.

⑬ TURN TO UNIFORM DIAMETER.



⑭ KNURL DESIRED PARTS.

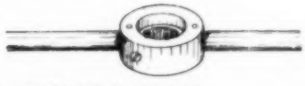
⑮ TRIM EDGES OF KNURLING AND POLISH THE BALANCE OF THE HANDLE.



⑯ CUT IN HALF, PLACE IN COLLET AND REDUCE THE DIAMETER OF THE END FOR THREADING.

⑰ CUT THREADS.

⑱ INSERT SETSCREWS AND HANDLES.

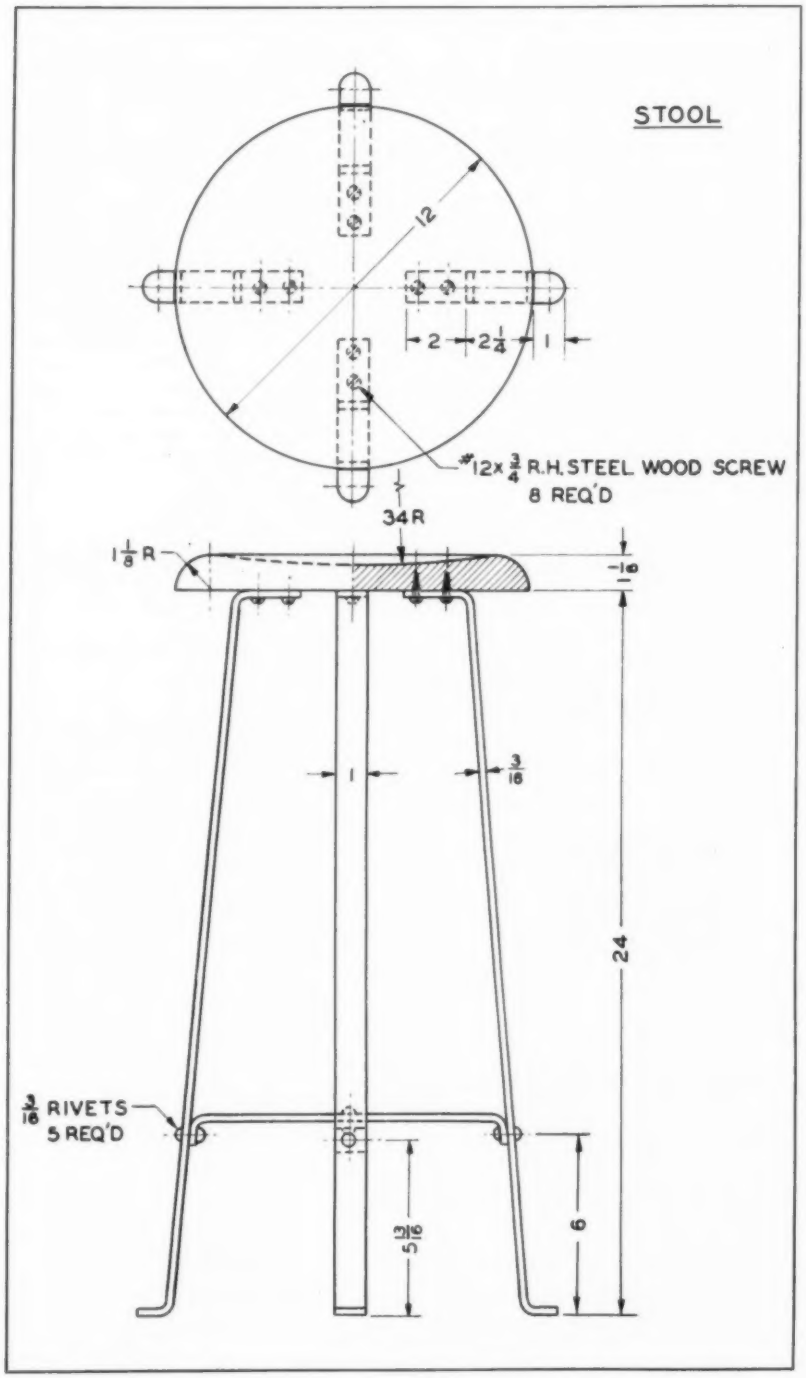


⑲ PIN HANDLES IN PLACE.

Project sheet — die holder submitted by Clifford L. Yard and Henry J. Kauffman, industrial-arts department, State Teachers College, Millersville, Pa.

to hold them in position. Check for alignment and squareness before any brazing or welding is started. When all joints have been joined together, cut the wire from around the frame, remove the plywood from the inside, clean all the joints and prepare for the finishing operation.

As illustrated, and by following standard finishing procedure such as steel wooling the surface, application of the primer and then the finish coat, contrast is obtained by using flat black paint on the body of the wastebasket and a gold or bronze on its frame.



Project sheet – stool, submitted by Clifford L. Yard and Henry J. Kauffman, industrial-arts department, State Teachers College, Millersville, Pa.

THE YOUNG PHOTOGRAPHER

HARRY A. GOLDSTEIN, A.P.S.A.
Tucson High School
Tucson, Ariz.

You can make contact prints from your negatives without the use of a darkroom! In fact, you can make prints in any room that has subdued daylight or artificial light.

I have received letters from young folks who are going to be photography counselors at camps. They all want to know of a method of making photographic contact prints in a room that often has holes like a Swiss cheese. Many of the letters are also from people who want to make prints in a certain room without having to black out completely every ray of light. (I still remember the good old days when I took over the bathroom for hours to do photographic work. It was the only room in the house I could make light-tight. Later I moved into the cellar when my father put in a sink down there.) Now you can make prints where light is not too bright. The basis for this new technique is a photographic paper by Eastman Kodak called *Velite Contact Printing Paper*. The need for a darkroom or a safelight is not necessary when using this paper.

How to Make Pictures at Camp

This new paper is ideal for use in a camp program or at home. Basically, the equipment needed to make pictures with Velite paper is as follows:

1. Contact printer with a number one photoflood bulb or a 150-watt lighting lamp.

2. For chemicals I suggest the use of Eastman's Tri-Chem Pack. This is a small unit containing dried chemicals in four envelopes. The developer comes in 2 envelopes marked A and B, the third envelope contains shortstop, and the fourth contains the fixing bath. Mix all the chemicals in 3 trays according to directions. Do not use more water than the 8 ounces specified. Doing so does not make the chemicals last longer.

3. Three trays made of hard rubber or enamelware. If mother has a few old soup plates, use them.

4. Two tongs to handle the prints, and mix chemicals.

5. A blotting roll to dry the pictures.

Now to make ready the chemicals. First, dissolve the developing chemicals in the tray of water using one of the tongs to stir. Into the second tray put the shortstop chemicals using the other tong to stir. Finally, mix the fixing chemicals in the third tray using the same tong used to mix the shortstop bath. Some folks often ask why the use of two tongs to handle the prints. The developing solution is alkaline, whereas the shortstop and fixing baths are

acid solutions. To put the tong that you have used in either of the acid solutions into the alkaline developing solution will soon weaken the developing action. Get into the good habit of using tongs the proper way.

Just a quick review before making pictures. The glass on the contact printer should be clean. Put the negative on the printer with the dull or emulsion side up and place a red mask or masking strips of some kind over the negative to make white margins. In a camp program, it may not be necessary to have the red negative masks for economy reasons. The developer (the solution which brings out the image on the paper) is completely mixed. The shortstop bath, used because it stops the developing action and prevents staining of the prints, is also ready. The fixing bath, a combination of chemicals to make the picture permanent, is ready.

Open the package of Velite paper. Take out one sheet and cut it into test strips one inch wide. While subdued daylight or artificial light has little effect on the paper, it is a good idea to cover the test strips and keep the envelope under a sheet of dark paper.

Observe carefully the Velite paper. One side is shiny and the other is a dull white. The shiny side contains the magic silver particles that will make the picture. Place this side down on the negative. Place the test strip on an important part of the negative. Make a test exposure for three seconds. Take the paper by the edge and drop it into the developing solution. Do not put your fingers on any part of the paper except the corners. Finger prints will show where you have handled the paper. Slide the test strip into the solution. Rock the tray slowly keeping the solution all over the print. If the exposure was correct, the picture should begin to appear in about 20 seconds. Keep rocking the tray gently until you see that the test strip is developed properly. The picture should develop in about one minute. If it develops in less than 45 seconds, it means that you have given it too long an exposure. Try another test strip, cutting the exposure time in half. On the contrary, if your test strip was too light, after even two minutes development, double the exposure on the next test strip.

After you have determined the proper exposure time, take a full sheet of Velite paper and expose it. Slide it quickly into the developing solution, and develop for about one minute. Pick the print out using the tongs and drop it into the shortstop bath. Rock this tray gently for a few seconds. Using the acid tongs pick up the print and drop it into the fixing bath. Rock this tray gently for at least one minute. The print should remain in this fixing solution for at least ten minutes. Remember to agitate the fixing solution over each print for at least the first minute. A dense negative will require a longer exposure than a thin negative. Remember, if the test strip is too light after developing for one minute, then double the exposure on the next test. If the test strip is too dark at the end of one minute then cut the exposure in half on the next test strip.

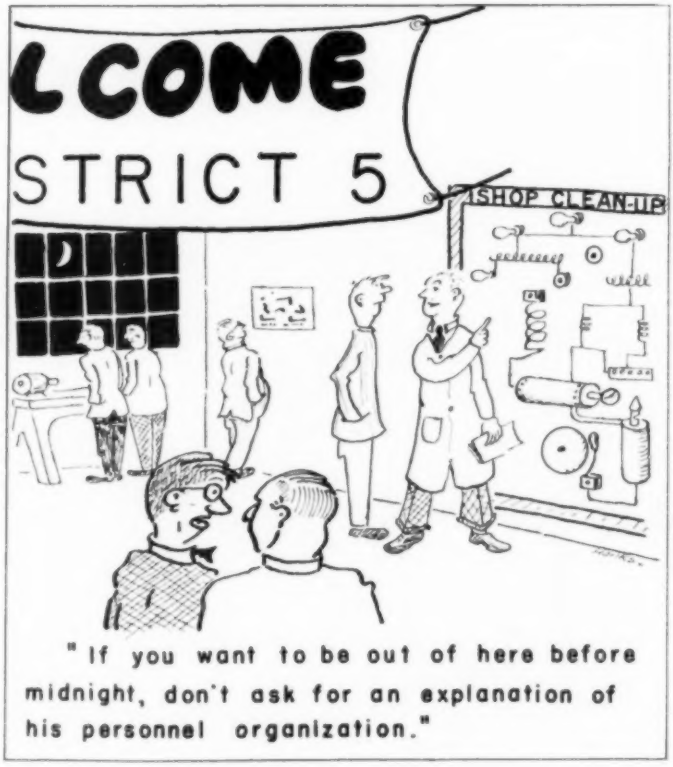
After the photographs have been in the fixing solution for ten minutes, take them out. Let the solution on the prints run off the prints back into the fixing tray for about 10 seconds. Put the prints into a tray where slow running water will wash the chemicals out of the paper. Move the pictures occasionally so they will be thoroughly washed. Wash the prints for 30 minutes. The final step is to dry the pictures. Let the water drain off for a few minutes before putting them into a blotter roll or blotter pad. Let them dry overnight.

For camera club sponsors, the School and Camera Club Division of Eastman Kodak Company, 343 State Street, Rochester 4, N. Y., has just released a series of bulletins. They are "Planning a Photo Essay," and "Photography in Your Future." Both are by A. L. TerLouw, F.P.S.A. Others are "Toning Kodak Papers" and "Some Chemical Reactions in Photography." For those who are teaching photography, and others interested, the Du Pont Corporation has just released a series of bulletins. They are: "Recommendations for the Education of Photo-journalism Students" and "Photo-journalism Teaching and a Change in Philosophy," both by Dr. C. William Horrell; "A Course Outline in Pictorial Communication," by Prof. Rodney Fox; "A Course Outline in News Photography," by W. R. Hazard; "A Course Outline in News Photography," by Prof. Edward F. Mason. An excellent paper by Vincent S. Jones, entitled "Up From Slavery," which is a must for all who teach photography.

All of these bulletins are available from J. B. Woodson, Jr., Photo Products Information, E. I. Du Pont de Nemours & Co., Wilmington 98, Del.

Harry A. Goldstein, B.A., M.A., A.P.S.A., and Teacher of Photography at the Tucson (Ariz.) high school has taught photography and has been a club sponsor for the past 15 years. At the moment he is endeavoring to develop a school camera club section in the Camera Club Division of the Photographic Society of America. Camera Club sponsors are invited to write for details on how to add interest and zest to their programs.

The End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STRICT 5
SHOP CLEAN-UP
"If you want to be out of here before midnight, don't ask for an explanation of his personnel organization."

Open house — William S. Hanks, State University of New York Teachers College, Oswego, N. Y.

Model 1055 Drawing or Art Table
Size of top, 42 x 30 x 1¼ in. Height of work surface, 41¼ in. at back, 37 in. at front. Legs and braces are of anodized satin-finish, heavy extruded aluminum tubing. Top is close-grained laminated hardwood with a metal U channel flush mounted at each end. Drawing board cabinets are of all-welded steel with box flange construction. They have built-in separators for storing 12 drawing boards. Model 242 stool is shown with units.

Here is a new concept in furniture for mechanical drawing and art classes

—you can have as many classes as you want without buying expensive 6-class tables

SPS has developed an entirely new concept in furniture for mechanical drawing and art classes—a combination of drawing tables, drawer and drawing board storage units which permits great versatility in number of classes without buying extra tables.

HERE'S HOW IT WORKS

A student is assigned a drawer and a drawing board at the start of a semester. These are stored in the service unit. At the start of each class, the student removes his drawer and his drawing board and carries them to his drawing table. At the end of each class, he returns both items to the service unit. The table at which he was working is then ready for the next class.

HERE ARE ITS ADVANTAGES

Only one drawer and one drawing board are at a table at any time. No drawer tiers and drawing board storage units are hung from the underside of the table to limit leg room. Classrooms are neater. There is no clutter under the table. Less possibility of pilfering or tampering with drawers and their contents. The individual student has his own drawer and drawing board safely stored in the service unit.

Schools with 2, 3 or 4 classes per day need not buy expensive 6-class tables. Schools with six classes per day need not buy extra 6-class tables for night classes. All they do in either case is determine the number of classes per table and buy service units to meet present and future requirements.

This furniture for mechanical drawing and art classes is just one element in the complete HALLOWELL School Shop Furniture line. See our Catalog 2112 for all units. Write for your copy today. HALLOWELL Shop Equipment Division, STANDARD PRESSED STEEL CO., Jenkintown 74, Pa.

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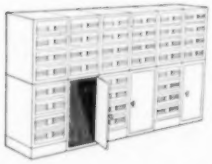
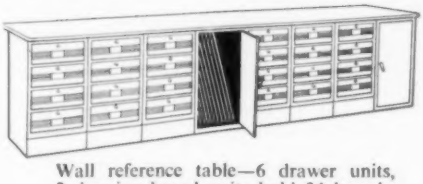
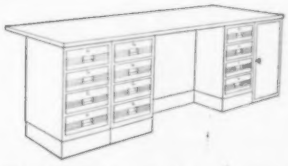
TYPICAL ARRANGEMENTS OF HALLOWELL SERVICE UNITS



2-high section of service units. Has 36 drawers, holds 36 boards.



Wall reference table—6 drawer units, 2 drawing board units hold 24 boards.



Planning table—3 drawer units, 1 drawing board unit for 12 boards.

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PERSONAL NEWS

(Continued from page 12A)

tional Education in 1923, Dr. Seidel was named state director for the program in 1928. He continued in the latter position until he was named assistant state superintendent in 1935. He also taught summer sessions at Maryland and Johns Hopkins Universities, and also at Pennsylvania State College.

Dr. Seidel had served as president of three national organizations — the National Association of State Supervisors of Industrial Education, the American Vocational Association, and the State Directors of Vocational Education.

He is survived by his wife, his son, two sisters, and two grandchildren.

EDWARD E. ERICKSON DIES

Edward E. Erickson, who served as North Dakota Director of Vocational Rehabilitation for 32 years, died early in November in Jamestown, N. Dak.

Mr. Erickson retired three years ago from this position, but last year returned to active service to become North Dakota's State Director of Vocational Education.

He was born in Minnesota, and attended Concordia College, Moorehead, and Mayville State Teachers College, earning his M.S. at North Dakota University.

He served as Walsh County Superintendent of Schools for six years and later as rural school inspector.

W. P. LOOMIS RETIRES

After a distinguished career in the Office of Education, William Penn Loomis, program specialist, North Atlantic Region, Trade and Industrial Education, retired October 31, 1957.

Born and educated in Pennsylvania, Mr. Loomis began early to learn the meaning of job skills. Upon graduation in 1910 from Pennsylvania State College, with a B.S. degree in electrical engineering, Mr. Loomis became geometry instructor in that college. Two years later, he went to McKeesport as assistant supervisor of manual training and teacher of mechanical drawing and woodworking.

From 1914–17 he taught mechanical drawing and science in Harrisburg, then became State Supervisor of Trade and Industrial Education in the Pennsylvania Department of Public Instruction. There, he helped to reorganize the vocational trade program to meet Smith-Hughes Law requirements.

In 1923 he received his M.A. degree in vocational education at Columbia University.

From 1924–26 Mr. Loomis was professor of industrial education in the School of Education of Pennsylvania State College and established a four-year undergraduate curriculum for teachers of shop and related subjects. A graduate division was added at this time.

In 1926 Mr. Loomis left the teaching field, and worked in life insurance until 1934. He then returned as Chief of the Division of Industrial Education and State Supervisor in Harrisburg.

It was on December 7, 1940, that Mr. Loomis was appointed to the Division of Vocational Education to assist the states in developing instructional materials for the National Defense Training Program prior to World War II and later for the War Production Training Program.

With the close of the war and the War Production Training Program, Mr. Loomis became Specialist for Supervisory and Teacher Training in the Trade and Industrial Education Branch of the Office of Education.

On September 2, 1951, Mr. Loomis was appointed Program Specialist, Trade and Industrial Education Branch, for the North Atlantic Region. Under his leadership, the North Atlantic Region prepared a number of publications, most noteworthy being "Three Dimensional Aids," and "Type C Programs."

DR. DOLL OF PRATT INSTITUTE DIES

Dr. Alfred W. Doll, assistant dean of the Pratt Institute School of Engineering in Brooklyn, N. Y.; and chairman of its department of physics, died in South Nassau Communities Hospital recently after a brief illness. He was 54 years old.

Dr. Doll was a native of Philadelphia. He earned a bachelor of science degree in mechanical engineering from the University of Pennsylvania in 1924, and a master's degree in engineering there in 1931. He also received a master of arts from Columbia University, and a Ph.D., from New York University in 1932.

He joined the Pratt faculty in 1925, after serving briefly with the Pennsylvania Railroad and the Electrical Development and Machine Corporation in Philadelphia.

Dr. Doll was a member of the American Society of Mechanical Engineers, the American Society of Electrical Engineers, and the American Institute of Physics. Since 1951 he had been head of the Malverne Civil Defense radiological service, where he lived.

He is survived by his wife and two daughters.

RAYMOND L. GRUBER DIES

Raymond L. Gruber, former director of the Cudahy Vocational and Adult Education School, died recently of a heart attack at his home in Milwaukee.

He was born in Austria and came to Milwaukee, Wis., in 1878. He was graduated in mechanical and electrical engineering in 1887 from Marquette University, and did postgraduate work at the University of Wisconsin. In 1891 he directed the conversion of the city's horse-drawn streetcars to electricity. He became vice-president of the Christensen Engineering Company of Milwaukee.

During the 1930's, he was supervisor of the Cudahy NYA program. For more than 30 years he served as co-ordinator and director of the Cudahy Vocational and Adult Education School. He retired in 1945.

Mr. Gruber was a grandnephew of Franz Gruber, the Austrian church organist and composer, who wrote the music for the well-known Christmas carol, "Silent Night, Holy Night."

Surviving Mr. Gruber are four sons and six daughters.

MR. SIMON ON BURMA GOVERNMENT ASSIGNMENT

Ernest J. Simon, dean of the Southern Illinois University Division of Technical and Adult Education, Carbondale, Ill., is scheduled to leave in January for a 20-month assignment as technical education consultant to the government of Burma.

A widely recognized authority in the field of vocational and technical education, Mr. Simon was selected for the position by the Ford Foundation, which is assisting the Burmese government in a long-range educational development program. Southern Illinois University has granted him leave-of-absence to September, 1959.

During his assignment Mr. Simon will live in private quarters at the government's new multi-million dollar Polytechnic Institute in Rangoon. As an advisory assistant to the government's Director of Technical Education,

(Continued on page 22A)

the Winners Circle

Congratulations to the winning contestants in the

Brodhead-Garrett Lumber Contest

1st Prize $300.00

DONALD JOHNSON, General Shop Instructor
Brokenstraw Valley Joint High School
Youngville, Pennsylvania
Graduate of State Teachers College
California, Pennsylvania
Three years teaching experience
ESTIMATED 5,891 BOARD FEET

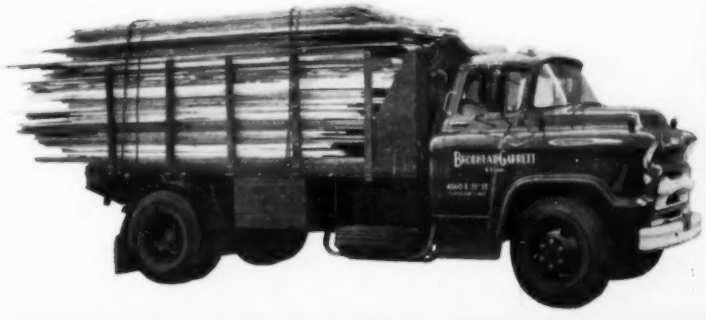
2nd Prize $200.00

JOSEPH CALIGUIRE, Craft Instructor
5815 Richmond Road, Richmond Heights, Ohio
Graduate of Kent State University, Kent, Ohio
Seven years teaching experience
ESTIMATED 5,889 BOARD FEET
(Entry postmarked Nov. 11, 1957)

3rd Prize $100.00

KEITH M. STREET, Woodworking Instructor
Wapello Community School
Wapello, Iowa
Graduate of Penn College, Oskaloosa, Iowa
Eight years teaching experience
ESTIMATED 5,895 BOARD FEET
(Entry postmarked Nov. 27, 1957)

Actual amount of lumber on the B-G truck 5,892 board feet



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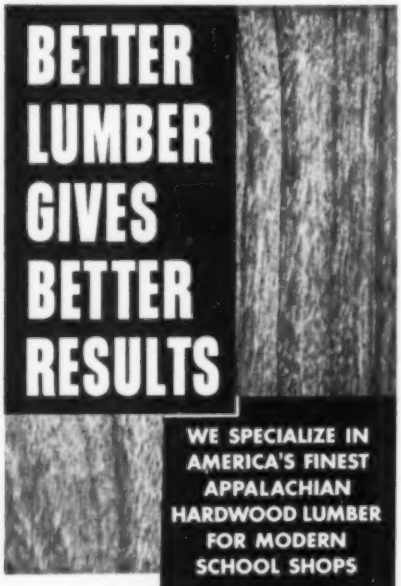

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EDUCATIONAL LUMBER DIVISION
P. O. Drawer 1091, Asheville, N. C.

PERSONAL NEWS

(Continued from page 20A)

he will be responsible for the selection and training of teachers; planning surveys to determine training needs; the development of courses in the Burmese schools; setting up vocational guidance and public relations programs; and other duties. He also will serve on a committee set up by the Prime Minister to review Burma's entire educational system.

Mr. Simon is a graduate of the University of Illinois. He was an industrial arts instructor for Ottumwa, Iowa, High School. Later he served as director of industrial and vocational education in the Champaign public schools, was assistant state director of war production training and Illinois State Director of Vocational Education.

DR. FRYKLUND REAPPOINTED ADVISER

The Ford Motor Company has announced that Dr. Verne C. Fryklund, president of Stout State College, Menomonie, Wis., has accepted reappointment for a second three-year term as Wisconsin's adviser of the Ford Industrial Arts Awards competition.

This international contest annually attracts the best of industrial arts projects from schools throughout the world. Even after local and state or national judging had "screened out" all but the outstanding projects, 5000 entries were evaluated last summer in Dearborn, Mich., site of the final judging.

Last year Dr. Fryklund was a special guest of the Ford Motor Company at the Dearborn finals. At that time, he also helped evaluate entries in the drafting area.

The purpose of the Ford Motor Company's international industrial arts awards program is to stimulate interest and excellence in technical education. Entries are judged not only on the basis of technical skill exhibited, but also on the application of such factors as mathematics, physics, art, and design.

WILLIAM KAMPRATH RETIRES

After serving the Buffalo School Department for fifty years, 47 of them in vocational education, William B. Kamprath is retiring on February 1, 1958. He is the first and only principal of the Burgard Vocational High School, Buffalo, N. Y.

In 1910 William B. Kamprath left academic education to teach printing in a basement room in old School 44. At that time he and two other educators bought a $25 press, and taught ninth-grade boys to use it. Together they printed *The Lincoln School Herald*.

The State had just passed its vocational education law and the head of the new program, Dr. Arthur Dean, visited School 44 during one of those printing sessions. "You've got vocational education right here," he told young Mr. Kamprath.

Two years later the young man and the late Edward T. Welsh moved to 44's basement and began the combined book work and shop work program that was eventually to become Burgard Vocational High School.

After two years, Mr. Kamprath and his school moved into rented quarters on Michigan and Tupper Streets. Then two years later, they moved into what is now School 35 on Elm Street.

Soon after, the automotive department was started with a car which was presented to Mr. Kamprath by the Pierce-Arrow Company.

Three years later a Curtiss Oriole airplane crashed on Niagara Falls Blvd., near Ellicott Creek. Mr. Kamprath wanted that plane so his boys could learn about the new gadget. His requisition for "one wrecked plane" was

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Introduction to basic principles through the use of related shop projects. **$4.50**

5. **Graphic Arts Procedures**
The "how-to" book of modern printing processes. **$4.50**

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Includes hundreds of actual shop problems. **$5.50**

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turned down by the board of education. Then he changed his requisition to read "one 0X5 motor with fuselage attached." This requisition was approved and the aviation program, which today has $750,000 worth of equipment, got under way.

Industrialists and unions joined forces to help fight for a new school building and Mr. Kamprath recalls that the board of education, the mayor, and the Council vied with one another in proposing the resolution for the $1,500,000 appropriation.

The late Henry P. Burgard donated the Kensington Ave. site and in September, 1930, the new building with the four-floor automobile ramp and the underground gasoline and oil tanks, opened its doors. During World War II those doors kept open 24 hours a day.

Mr. Kamprath is a life member of the American Vocational Association for the past 25 years, and he is working on the program for the group's 1958 convention, which will be held in Buffalo.

Upon his retirement he and his wife are going on a pleasure cruise to the Caribbean, and later on a business trip to Europe. He will serve as a tour guide for the Pieper Travel Bureau Inc., beginning a tour in April.

Mr. Kamprath has been a long-time member of the Buffalo Schoolmasters Association. The schoolmasters honored him at a dinner in November.

E. L. BOWSHER IN NEW POST

E. L. Bowsher, veteran superintendent of public schools at Toledo, Ohio, and long active in the work of the American Automobile Association and its affiliates, has been named secretary-manager of the Toledo Automobile Club.

Mr. Bowsher took over his new post immediately after tendering his formal resignation to the Toledo board of education at its meeting January 6, 1958.

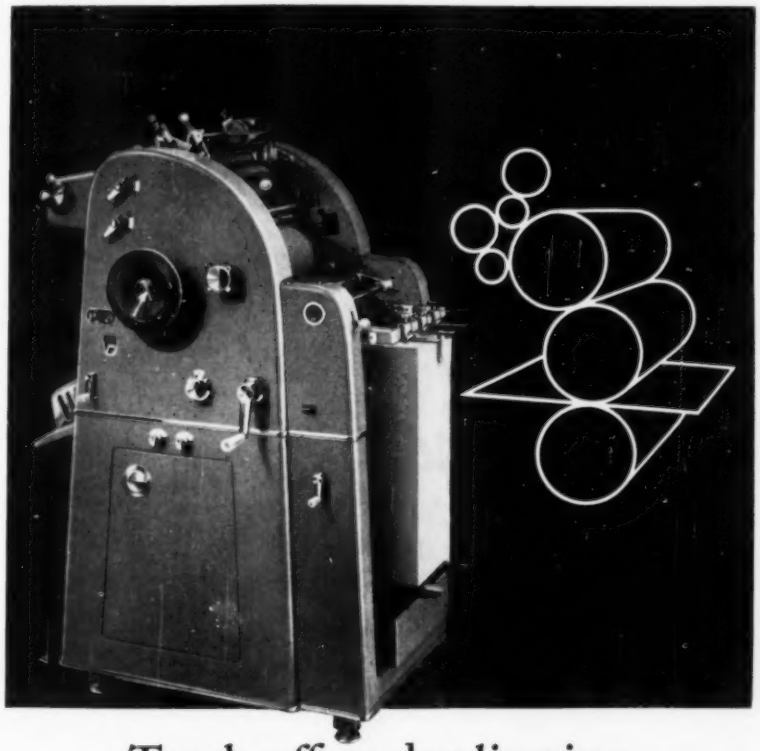
Former Ohio State Superintendent of Education, Mr. Bowsher was appointed head of the Toledo public schools system in 1937 and has the longest record of service in that post in Toledo's history.

He was born in Cridersville, Ohio, and was graduated from Defiance College. After only a year of teaching he was made superintendent of schools at Waverly, Ohio, and successively became chief administrator at Wauseon and Ashland, Ohio, before his two years of service as state superintendent. He is a former member of the board of trustees at Bowling Green State University and Kent State. He has served as school expert on the Ohio Program Commission and in 1954 was head of a study group which carried on surveys to provide guidance in revision of Ohio's education laws.

Hand in hand with school work he had played an active role in AAA activities, being a member of the national board of the AAA, former president of the Ohio Automobile Association, and a board member and past president of the Toledo Unit. He has been a frequent speaker on Automobile Association programs.

Mr. Bowsher was the unanimous choice of the club's board of trustees to fill the vacancy created by the death of Dwight Hatcher June 6, 1957.

A collection of 217 solid wood panels from 37 countries has been made by a Texas builder who gave the panels coats of shellac and wax. Fresh, white shellac that has been thinned is used for such work to protect and add beauty. — *Shellac Information Bureau.*



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News Notes

GRADUATE PROGRAM AT BEMIDJI STATE COLLEGE

At the annual meeting of the North Central Association of Colleges and Secondary Schools held in Chicago during April, 1957, the Bemidji State College was accredited to offer the master of education degree in several major fields.

Although the graduate program has been functioning for the past four summers, the Industrial Arts Education program was offered for the first time during the past summer session and is being continued during the present school year for in-service teachers under the direction of Dr. William A. Sellon.

The first summer's enrollment included students from Minnesota, Michigan, Nebraska, Oregon, and California, and out-numbered all other departments in the college with the exception of the Division of Health and Physical Education.

CLEVELAND DEDICATES NEW TRADE SCHOOL

Ceremonies formally opening Cleveland's new Max S. Hayes Trade School were held October 29, 1957.

Joseph M. Gallagher, president, Cleveland board of education, headed a program that presented prominent representatives of education, industry, and labor.

Cleveland has trained skilled workers since World War I — through two postwar periods, a boom, a depression, several minor recessions, and a number of critical periods of labor shortage. The new plant, functional, with room walls that can readily be expanded or contracted, was planned for adaptability to changing conditions.

The building which was constructed at a total cost of $3,381,854.33, includes 34 shops, 19 related classrooms, 11 additional classrooms, and three laboratories.

It is named to honor Max S. Hayes, for more than 5 years a Cleveland editor who dedicated his work to the cause of labor.

NATIONAL SCHOLARSHIPS ANNOUNCED

The Education Council of the Graphic Arts Industry, Inc., has announced that there will be a minimum of five $1,000 competitive national scholarships awarded for the school year starting September, 1958, for studies connected with the graphic arts industry.

It is one of the purposes of the National Scholarship Trust Fund of the Education Council of the Graphic Arts Industry, Inc., to provide the opportunity for qualified and interested young people who desire a college education to prepare themselves for careers in the graphic arts industry.

Those eligible are boys or girls interested in a career in the graphic arts industry; and high school seniors who will be graduated in January or June of 1958, or a high school graduate who has been graduated not more than three years prior to January 1 of the year of application.

At least five full four-year competitive National Graphic Arts Scholarships will be awarded. After the first four years of the Scholarship Program, it is expected that there will be at least 20 scholarships in force. Each recipient of a National Graphic Arts Scholarship will receive an award of $1,000 per academic year.

Any young person who applies for a scholarship should, of course, have a good high school record, both in studies and in extracurricular activities. In the final selection, awards are based on the degree of college success which may be expected of the student.

Interested persons may receive more complete information by writing to: *National Scholarship Trust Fund, Education Council of The Graphic Arts Industry, Inc., 5728 Connecticut Avenue, N.W., Washington 15, D. C.*

ATS RESEARCH AWARDS

John A. Fuzak, Professor of Industrial Education, Michigan State University, has received first award of $1,000 in the 1957 American Technical Society Research Awards Program for his study on the relationship between physical maturation in junior high school boys and their ability to perform well in industrial arts classes. The study has been greeted by educators as an outstanding contribution to industrial education, and a model to be emulated in future research endeavors in this area.

The study was undertaken for the twofold purpose of investigating the role of physical maturation in industrial arts performance, and of introducing and encouraging the use of effective research methods in industrial arts teacher training. The latter purpose reflects Fuzak's conviction that research into concrete teaching problems is becoming increasingly important in industrial education, and his concern with the apparent lack of awareness of this need on the part of many industrial arts teachers. Entitled *The Role of Physical Maturation in Determining the Ability of Junior High School Boys to Perform*

(Continued on page 26A)

MILLERS FALLS TOOLS
1868
The most advanced saw line on the market
MODEL 800 - 8¼" - $95.00
MODEL 747 - 7¼" - $84.50
MODEL 727 - 7" - $74.50
MODEL 626 - 6½" - $54.50

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a great ALL-NEW line of MILLERS FALLS

FULL-POWER SAWS

combining { POWER, PRICE, PERFORMANCE

There's a saw for every job and every budget . . . in this brand-new, all-new line of Millers Falls electric saws. Paced by two outstanding heavy-duty models loaded with all the exclusive features and top-quality engineering you'd expect from Millers Falls!

"Put them to the wood . . . and purchase on performance!"

TWO HEAVY-DUTY MODELS

Two powerful, all-new saws with outstanding professional quality, tremendous cutting capacity (up to 2⅞" at 90°; 2$^{9}/_{32}$" at 45°), plenty of power (full 2 h.p.), and rugged construction — yet light enough for student use and beautifully balanced for ease in handling. Features include exclusive Micro-Guide, safety window, integral depth and angle adjustments with direct-reading scales, wide base and telescoping guard.

No. 800	8¼"	Heavy Duty	$95.00
No. 747	7¼"	Heavy Duty	$84.50

TWO STANDARD-DUTY MODELS

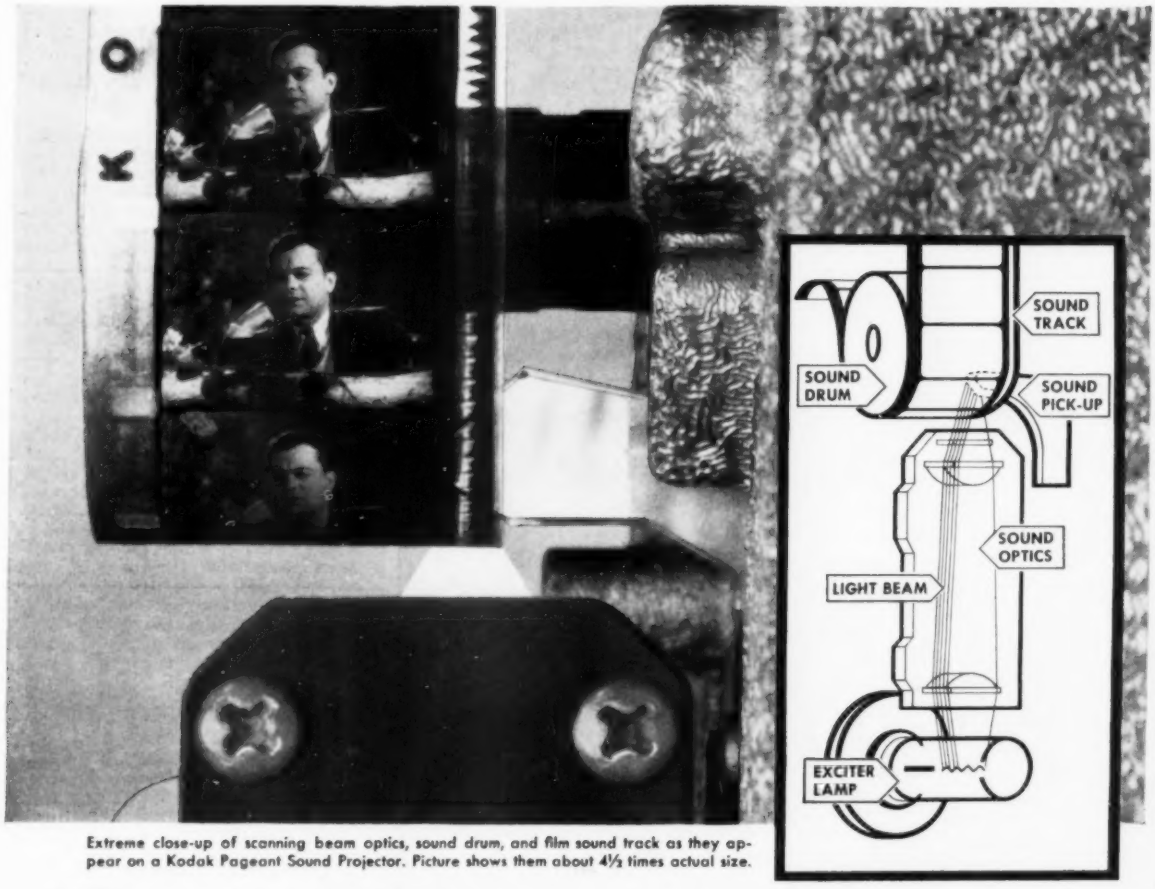
Two rugged new saws with a tremendous 65% power boost over previous models . . . make light work of 90% of all school shop jobs . . . including compound mitres in 2" dressed lumber at 45°. Both models offer truly professional quality . . . at popular prices.

No. 727	7"	Standard Duty	$74.50
No. 626	6½"	Standard Duty	$54.50

For full information on this great new saw line, write today to

MILLERS FALLS COMPANY
Dept. IA-33, Greenfield, Mass.

FINEST HAND AND POWER TOOLS MADE FOR HOME AND INDUSTRY



Extreme close-up of scanning beam optics, sound drum, and film sound track as they appear on a Kodak Pageant Sound Projector. Picture shows them about 4½ times actual size.

How to make your movies sound as good as they look

If you want to *hear all the sound* on a 16mm sound track, your movie projector should have an adjustable scanning beam and a well-baffled speaker, among other refinements. Here's why . . .

The photographic (optical) sound track on your 16mm films is a "picture" of the sound vibrations you want to hear. To "see" this sound picture, a 16mm projector scans the variations in area or density with a tiny beam of light.

The beam shines through the sound track and registers its variations on a photo-electric cell. The cell turns these modulated light rays into electrical impulses and sends them to the amplifier, then on to the loud speaker.

50 to 7000 cycles per second

The best 16mm sound film recording picks up sound waves varying from 50 to 7000 cycles per second. If you want to hear this full frequency range, your projector must be able to reproduce *both* the highest frequencies (6000-7000 cps.) and the lowest (50-100 cps.). When your projector won't do this you lose much of the naturalness and value of your sound reproduction.

The Kodak Pageant Sound Projector has a "Fidelity Control." It is a simple device for focusing the tiny scanning beam with great accuracy so that it can pick up all the high tweets and trills on your sound track. This is necessary because 16mm sound tracks differ—some are projected with the emulsion side facing the sound optics, others, with the base side facing it. If scanning focus is *fixed* and cannot be adjusted, the light beam may be too wide to measure the frantic succession of high-frequency beeps or tones.

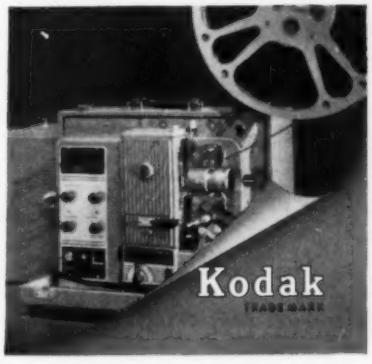
At 7000 cycles per second, for example, these variations in the sound track are only .001-inch wide. Yet the Pageant Fidelity Control squeezes its sliver of light through even this miniscule .001-inch gap, and brings all the high-frequency sounds crisp and clear to your ear.

But how about the woofs?

At the far end of the Pageant sound system you get another plus value. It is the speaker—mounted as it should be in a baffled enclosure. This allows you to hear the low-frequency sounds—woofs and basses that add resonance and body to please the ear.

Without baffling, you'd lose these low tones because they tend to "leak" around the sides of the speaker cone, from front to back and back to front, and cancel each other out. The baffled Pageant enclosure projects these bass sounds out into the room where you can enjoy them.

Ask your Kodak audio-visual dealer to demonstrate Pageant sound for you. Use a film of your own choosing. Compare Pageant sound with the finest 16mm sound you've ever heard. Then select your projector with your ears wide open.



EASTMAN KODAK COMPANY, Dept. 8-V, Rochester 4, N. Y.

NEWS NOTES

(Continued from page 24A)

Complex Finger Co-ordinative Activities and an Index to Level of Ability, the study encompasses nearly five years of exhaustive research into the industrial arts performance of more than 300 junior school students in the schools of Lansing, Mich.

Five additional awards of merit of $200 each have been presented to entrants whose studies, in the opinions of the judges, contribute substantially to understanding and practice in industrial education. Awards of merit have been presented to the following winners (listed alphabetically): Ralph R. Bentley, Associate Professor of Agricultural Education, Purdue University; John N. Clausen, Instructor, Institute of Technology, University of Minnesota; Thomas R. Gaines, Professor of Industrial Arts, Central Missouri State College; Robert S. Swanson, Associate Professor, Industrial Education, Stout State College; and Ray A. Wigen, Director of Graduate Studies, Stout State College.

The 1957 ATS Research Awards Program is the first in a series proposed by the Society in order to stimulate research and improve practices in industrial arts and vocational education. Winners were selected from a total of 75 entrants by members of the ATS Editorial Advisory Board. The Board is composed of men eminent in industrial arts and vocational education, and representing virtually every part of the country. Continuation of the Research Awards Program in future years is largely contingent upon the degree of interest it succeeds in arousing among industrial educators.

MAKE YOUR OWN
DECORATIVE GLASS PANELS
A bit of nature preserved forevermore in one of the most attractive translucent screens you've ever seen. Flowers, leaves, grasses and butterflies are permanently embedded between Castoglas-impregnated fiberglass. This is a fascinating craft, easy to do and surprisingly inexpensive. Use them for room dividers or make lamps, bowls, trays, place mats and other fine accessories from the same materials. Mail 25¢ for illustrated instructions to:
Industrial Arts Dept. B-50
The Castolite Company
Woodstock, Illinois

VOCATIONAL EDUCATION STUDY TOLD

At a recent meeting of the Nebraska State Board of Education, a report was made by Cecil Stanley, state director of vocational education, that there are now 37,315 persons enrolled in vocational education courses in Nebraska. Mr. Stanley said that 13,610 of these enrolled are high schools students and 23,705 are in adult education.

The courses are given at Nebraska high schools and involve agriculture, merchandising, homemaking, practical nursing, and trade and industrial training.

Mr. Stanley estimates 5100 prep school students are taking agriculture, 240 merchandising, and 970 trade and industrial training. Girls taking homemaking, and women in the adult courses make up the total. The courses are financed by state and federal funds.

On the adult side, 6750 are taking agriculture courses, 2200 merchandising, 6185 trade and industrial, and 280 practical nursing.

The board was presented a request by Mr. Stanley received from the American Vocational Association for the state board to express itself on whether federal aid to vocational education has been beneficial. On the motion of Frank Landis of Lincoln, the request was tabled, although in discussion board members indicated the progress has been beneficial.

WELDING HANDBOOK

The American Welding Society announces that the newly published first section of the fourth edition of the *Welding Handbook*, contains 560 pages, 420 illustrations, and 86 or more tables. It deals with the fundamentals of welding and its eleven chapters contain: standard welding terms and their definitions, engineering tables, welding metallurgy, properties of welded joints, thermal and mechanical treatment of weldments, design of welded joints, estimating costs, inspection, mechanical testing of welds, statistical control and safe practices.

Subsequent sections of the handbook will cover: welding processes; miscellaneous metal-joining, cutting and maintenance processes and practices; metals; and finally, applications of welding.

Copies may be obtained from the *American Welding Society, 33 West 39th St., New York 18, N. Y.*, at a list price of $9 per copy.

New Publications

Handmade Rugs

By Kathryn Andrews Marinoff. Paper, 93 pp., 6⅛ by 9¼ in., illus., $1.75. The Bruce Publishing Co., 400 N. Broadway, Milwaukee 1, Wis.

This is a book of the *how to do it yourself* type on how to make handmade rugs.

The four parts explain about braided rugs, hooked rugs, woven and other type rugs, and how to care for, clean, and repair handmade rugs and rug binding.

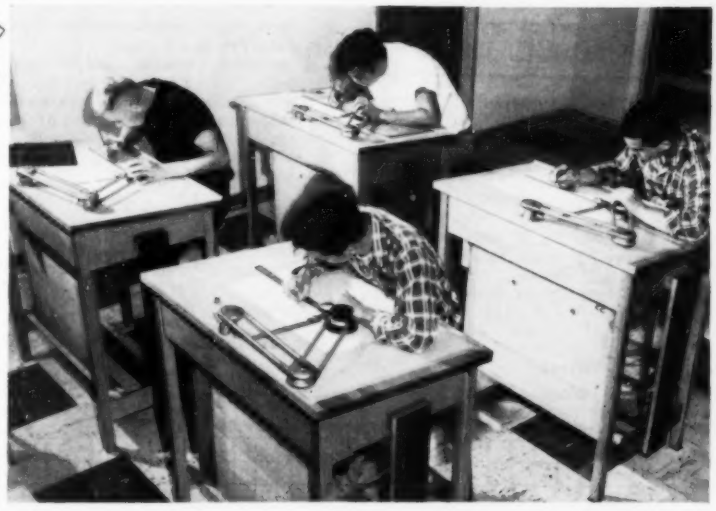
Atomic Energy in Agriculture

By William E. Dick. Cloth, 150 pp., 5½ by 8¾ in., illus., $6. Philosophical Library, Inc., New York, N. Y.

In this book on the peaceful uses of atomic energy the author (a research biologist and an editor of chemical journals) points out

(Continued on page 28A)

Locations of Schools Now Using UNIVERSAL Drafting Machines in Their Drafting Rooms. (Partial Listing) →



Desk-Topper drafting machines in classroom use at Allentown High School, Allentown, Pa. John T. Shuman, Assistant to the Superintendent, Industrial Arts, Vocational Education; Thomas M. Schrader, Head Drafting Dept. Installed by Frederick Post Company, Englewood, New Jersey.

SELECT THE DRAFTING MACHINES *Preferred* BY EDUCATORS and INDUSTRY

Every week more schools and colleges are installing Universal drafting machines to prepare their students in the modern drafting techniques used in industry. Write for illustrated folder and your free copy of technical text instruction manual, "Drafting Machine Practice." (Please include school name and address.)

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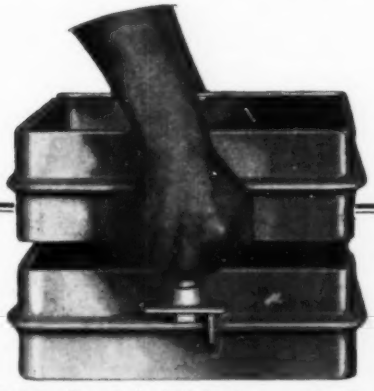
USE STERLING STEEL FLASKS FOR *Easy Handling*



Sterling Style "E" Flask

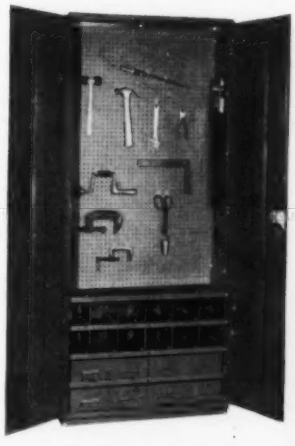
You'll find Sterling Style "E" Flasks exceptionally easy to handle because pin lugs are combined with handles. In many foundries, these Style "E" Flasks have replaced snap flasks. They prevent runt outs . . . require less sand. Sterling Steel Flasks combine maximum strength with minimum weight. They retain their rigidity and accuracy, year-in, year-out. Write for Sterling Catalog.

STERLING WHEELBARROW CO. Milwaukee 14, Wis., U.S.A.

Sterling FOUNDRY FLASKS

here's the answer to your

Tool Storage Problems!



Bolted end-to-end, these free-standing cabinets form a continuous wall storage unit.

Overall size of cabinet is 36" wide, 12" deep and 7'3" high. Tool compartment is 36" wide, 12" deep and 5'0" high with perforated masonite tool board mounted on back and sides. Fifty tool hooks are also furnished with cabinet.

Cabinet also contains twelve bins and eight box drawers for small parts storage.

Double swinging doors with lock provide maximum security and promote good housekeeping.

Get complete information... send for School Shop Equipment Catalog TODAY!

VISIT BOOTH A-24 — N.E.A. CONVENTION IN CLEVELAND

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6801 State Road Dept. V-20 Philadelphia 35, Pa.

NEW PUBLICATIONS

(Continued from page 26A)

how atomic energy may not only speed up plant breeding but also makes possible the production of agricultural plants hitherto unobtainable, and how atomic energy may be used to destroy and control pests and diseases.

The six chapters of this book treat of: remaking crop plants with radiation, tracing the path of carbon with radioisotopes, the path of the other elements, radioactive materials in the fight against pests, radioactive tracers and forestry, and atomic radiation and food preservation.

Youth at the Wheel

By Harold T. Glenn. Cloth, 415 pp., 6⅛ by 9⅛ in., illus. Price $3.60. Chas. A. Bennett Co., Inc., Peoria, Ill.

A splendidly written, well-illustrated, and excellently planned book on safe driving. While it is written for the youth taking driving instructions, it ought to be read by everyone driving an automobile, and it should be read without adhering to built-up preconceived notions.

The book presents the subject matter under the following chapter headings: The automobile and modern life, the driver, the car, laws affecting driving, sound driving practices, accidents — causes and prevention, care and use of car, pedestrian and cycle safety, and careers and the future.

Arc Welding Lessons for School and Farm Shop

By Harold L. Kugler. Cloth, 343 pp., 5⅞ by 8⅞ in., illus., $1. James F. Lincoln Arc Welding Foundation, Cleveland 17, Ohio.

This is the second edition of this book. It points out the increasing importance of arc welding machines and electrodes during the past few years that have created new knowledge of welding procedures. This has also made necessary some minor changes throughout the book and this new edition.

Several of the lessons have been completely revised.

Part one presents the informational lessons. Part two describes operations to develop skill in the use of welding equipment, and part three presents numerous welded projects.

High Fidelity Simplified

By Harold Weiler. Paper, 216 pp., 5½ by 8½ in., illus., $2.50. John F. Rider Publisher, Inc., New York, N. Y.

This is a third edition of this book in which a substantial portion has been revised. Many older models of hi-fi equipment have been removed and new ones have been added, thereby bringing this third edition completely up to date.

The 13 chapters of the book present the how, what, why, and where of high fidelity reproduction; sound, acoustics, electronics and music; the simple loud-speaker, the high fidelity loud-speaker; enclosures for the loud-speaker, basic amplifier parts 1 and 2; the record player parts 1 and 2; the tuner; use of home music system; and tape recorders.

Silk Screen Printing

By James Eisenberg and Francis J. Kafka. Paper, 91 pp., 7¾ by 10¼ in., illus., $1.50. McKnight & McKnight Publishing Co., Bloomington, Ill.

An excellent book on an interesting subject. It is well written and illustrated.

It contains 18 chapters which explain the silk screen printing, making your own equipment, additional equipment, colors and color mixing, paper stencil method, the tusche and glue method, indirect photographic method, direct photographic method, art work and lettering, multicolor screening, care and cleaning of equipment, the silk screen industry, sources of supply, projects, and a bibliography.

Blueprint Reading and Sketching for the Electrical Trades — Commercial

By Howard W. Fisher, Robert L. Arendt, and Howell Cheney. Paper, spiral binding, 152 pp., 7⅞ by 10¼ in., $2.50. Answer Book, paper, 28 pp., 7⅞ by 10¼ in., $1. Delmar Publishers, Inc., Albany, N. Y.

This blueprint reading book belongs to a series of three covering residential, commercial, and industrial-electrical installations. The work on this book was done by the Connecticut Curriculum Committee for blueprint reading for the electrical trades.

The book is based on an actual commercial building — two stories and basement. Eleven full-size blueprints of this building accompany the text.

The contents of the book covers a survey of the electrical requirements, the three-phase 120-volt system, the drugstore occupancy, and bakery, insurance office, doctor's office, beauty salon, owner's circuit requirements, telephone raceway system, lighting fixtures, and the service entrance and metering facilities of this building.

The answer book is furnished without charge on orders of ten or more of the text-workbook.

Practical Pictorial Guide to Mechanisms and Machines

By Simon S. Palestrant. Cloth, 255 pp., 6$\frac{5}{16}$ by 9$\frac{5}{16}$ in., illus., $4. University Books, Inc., New York, N. Y.

38 live ideas for the metal and general shop instructor
BRAND NEW!
Contemporary Sheet Metal Projects for beginning metal workers
Six spanking new projects that teach sheet and perforated metal on the Bender, Roller and Brake.
UP-TO-DATE!
Suggestions in Wrought Iron for the Modern Home
Eight excellent examples of functional design that combine wood with wrought iron and expanded metal.
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Six projects featuring rod, tube and angle forming selected from the 58 designs of Lux and Towers new book.
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Twelve plastic projects that will help you plan stretch, vacuum and blow forming in the exciting area of the new Di-Acro Plastic Press.
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351 Eighth Ave., Lake City, Minn.
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School
Address

Designers, hobbyists, mechanically minded men, draftsmen, and inventors will find this book very interesting and quite helpful. It contains 4000 illustrations showing mechanical devices and motions.

The subjects covered are: measurement, fluids, mechanics, heat, light, sound, electricity, and miscellaneous mechanisms.

Each chapter has an explanatory opening statement. The book also contains a short but comprehensive glossary of mechanical and technical terms. It also shows how to proceed when one wants to obtain a patent.

1958 TV Manual, TV-14

Compiled by M. N. Beitman. Paper, 192 pp., $3. Supreme Publications, Highland Park, Ill.

A new volume of television factory data which presents all the data needed by the repairman for all present-day TV sets. Like other manuals in the television series, this book contains circuit explanations, alignment facts, test patterns, response curves, waveforms, voltage charts, and workbench diagrams.

Repairing Hi-Fi Systems

By David Fidelman. Paper, 212 pp., $3.90. John F. Rider Publisher, Inc., 116 West 14th St., New York 11, N. Y.

This book tells how to find troubles and repair faults in hi-fi equipment with no test equipment, simple equipment, or elaborate equipment. It discusses servicing of amplifiers, preamplifiers, tuners, tape recorders, etc., as well as the installation of these units. This valuable book is simply written and easy to understand.

Business and Personal News

VISIONAIRE LIBRARY FURNITURE NOW A PRODUCT OF STACOR EQUIPMENT COMPANY

Stacor Equipment Company, Newark, N. J., manufacturers of Lifetime Quality drafting and school equipment, have taken over the production and sale of Visionaire Library Furniture.

Originated by Globe-Wernicke nearly 75 years ago, Visionaire Library furniture is installed in libraries throughout the world. It was bought over and continued by the Valverde Company of Scranton, Pa., makers of church furniture and architectural woodwork, in 1954, and was recently purchased from them by Stacor.

Full catalog, prices, and other information with respect to Stacor Visionaire Library Furniture is available from Stacor Equipment Company.

JOINING OF TWO ORGANIZATIONS

The Double A Products Company of Manchester, Mich., has joined forces with the Brown & Sharpe Manufacturing Company of Providence, R. I., as a wholly owned subsidiary, as announced by Herbert H. Upton, president of Double A, and Henry D. Sharpe, Jr., president of Brown & Sharpe.

The Double A Products Company manufactures a wide line of commerical hydraulic control valves used extensively in construction of automated machine tools and heavy capital equipment of many types.

Brown & Sharpe is engaged in the manufacture of gear, centrifugal and vane pumps through its Hydraulic Products Division. The joining of the two organizations envisions technical co-operation toward creation of new and broader hydraulic product lines, and the opening of wider channels of distribution to both companies.

BLACK & DECKER OPENS IN NEW ZEALAND

Formation of a new subsidiary company in Auckland, New Zealand, was announced recently by Robert D. Black, president and chairman of The Black & Decker Manufacturing Company, Towson, Md.

The new company, Black & Decker (New Zealand) Ltd., will sell and service the electric tool company's products in the New Zealand area.

James Smith-Palmer, who has served as the company's sales representative in the area for two years, will be in charge, answering directly to M. W. Boyce, managing director of their Australian company.

ROCKWELL-DELTA MAKE TWO NEW APPOINTMENTS

David Huttner and Robert V. Kintz have joined Rockwell Manufacturing Company's Delta Power Tool Division as school sales specialists. Mr. Huttner will work in the West Central region with headquarters in Chicago, and Mr. Kintz in the East Central region with headquarters in Pittsburgh. Rockwell-Delta school sales specialists work with Delta dealers to help schools plan and equip industrial arts and vocational shops.

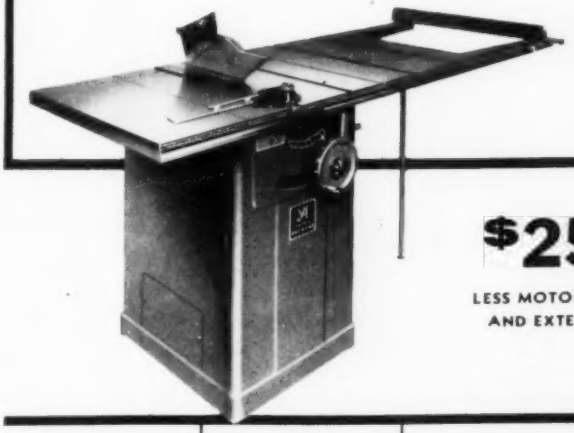
Mr. Huttner is a graduate of Bradley University, and taught industrial arts in Chicago's Morgan Park High School from September, 1952 until June, 1957. He has also been mayor of Merrionette Park, the Chicago suburb where he lives.

(Continued on next page)

BIG,

POWERFUL 10" SAW

Gets almost double work surface from solid table extensions: over 25" in front of blade with mitre gauge extended. Rips 3⅛" stock with blade at 90°. The only 10" tilting-arbor circular saw using standard NEMA frame motor, up to 3 HP. more production, no vibration, no kickbacks.



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12" LATHE

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8" JOINTER

20" BAND SAW

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CHILTON'S AUTOMOTIVE JOB SHEETS

Separating the "how to" from the "why" these unique illustrated job sheets can be used on live cars or instructional units and varied according to equipment available. Educationally sound, flexible, they reduce the need for lecture-type instruction.

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A CHILTON BOOK

BUSINESS & PERSONAL NEWS

(Continued from previous page)

Mr. Kintz is former sales manager of Smith Typewriter Exchange, Washington, D. C., and, prior to entering the sales field, completed a twenty-year career service with the U. S. Navy. During this service he received 11 decorations including the Purple Heart and Presidential Unit Citation. He lives in Akron, Ohio.

COLUMBIAN VISE RECEIVES AWARD

The Columbian Vise & Mfg. Co., Cleveland, Ohio, was one of 26 national firms to recently receive an "award of excellence" from the Cleveland Advertising Club.

The award plaque was presented to Dan C. Swander, Jr., executive vice-president of the company, for outstanding sales results achieved through advertising in 1956-57. It represented the third advertising award for Columbian in the past three years. Others were from the National and Southern Industrial Distributors Association and TF Club. The latter is a national organization of industrial advertising counselors.

CONSTANTINE WOOD-O-RAMA

Specimens of rare woods of many kinds, including the most unusual and most beautiful woods of the world are contained in a new permanent exhibit in the Constantine Building, 2050 Eastchester Road, New York. It was assembled by Albert Constantine, Jr., president of Albert Constantine and Son, Inc., importers, manufacturers and dealers in hardwood veneers and lumber. The firm has been

(Continued on page 32A)

PLAY IT SAFE...*with the* GS No. 9000 GOGGLE

No. 9000 — Clear No. 9100 — Green

FOR SHOP AND LABORATORY

This featherweight one-piece goggle fits all faces — men and women alike. Optically perfect and molded to .060" thickness, lenses are impact-resistant and afford protection for light grinding, spot welding, and other semi-hazardous operations. May be worn over prescription glasses. Handsome styling ends complaints about ugly, cumbersome goggles — everyone will want to wear them!

PRICES FOR NO. 9000 AND NO. 9100:
1 to 11 doz. $7.20 per doz. 12 to 35 doz. $6.60 per doz. 36 doz. or more $6.00 per doz.

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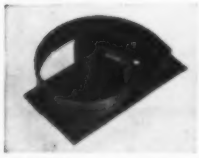

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Anyone can create these beautiful projects without experience

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If you buy or specify drafting materials and drawing instruments, write for this handy Ready Reference Chart with convenient decimal table. Here's a fully illustrated Reference Chart showing the complete Alvin line. Makes a handy buying reference for mechanical and architectural drawing teachers. Can be tacked on a wall for students' reference. For your free copy write to Alvin Today!

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- DRAFTING INSTRUMENTS
- DESIGNING AIDS
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"QUALITY AT THE RIGHT PRICE"
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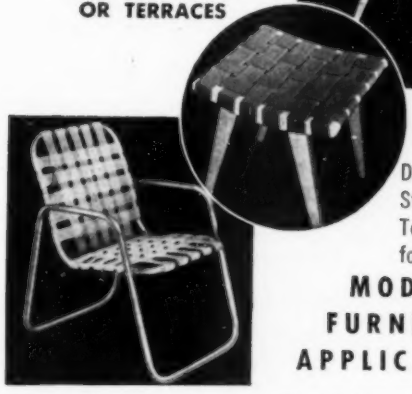
Windsor, Connecticut

COLORFUL
WEBBING
TWO INCHES WIDE
COTTONS
WOVEN PLASTICS
FOR INTERIORS
OR TERRACES



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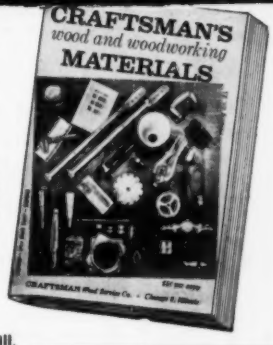

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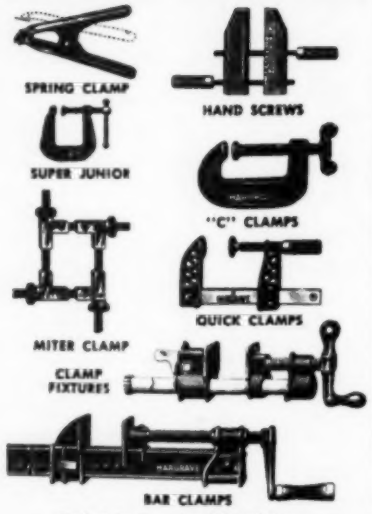

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THE CINCINNATI TOOL CO.
Waverly & Main — Cincinnati 12, Ohio

BUSINESS & PERSONAL NEWS

(Continued from page 30A)

in the wood business in New York for 145 years and is well known to amateur and professional craftsmen in the United States and abroad because it publishes a 126-page combination craftsmen's manual and mail order catalog devoted entirely to fine veneers, woods, and craftwork supplies.

What gave Mr. Constantine the idea for the Wood-O-Rama was the curiosity about woods displayed by visitors to the Constantine Building. He is a member of the International Wood Collectors Society.

The Wood-O-Rama is open to the public free every day except Sunday from 8:00 a.m. to 5:00 p.m. A souvenir list of the woods is presented to all visitors.

Descriptive Material

BURSTEIN-APPLEBEE CATALOG

Packed with the very latest in equipment for radio and electronics and television, the new catalog for 1958 of Burstein-Applebee Company is now available. Hundreds of new items are listed in it for the first time. With 172 large pages, it features 21 pages of bargains not to be found in any other catalog.

You are invited to send for your free copy of the 1958 B-A catalog, a buying guide for everything in Radio-TV, Hi-Fi and Electronics; also many pages of hand and power tools, published by the old and well-established electronic supply house of Burstein-Applebee Company.

(For further details encircle index code 212)

"20,000 VOLTS UNDER THE HOOD"

Delco-Remy Division, General Motors Corporation, have announced another new, slide-sound, color film kit entitled "20,000 Volts Under the Hood," covering the ignition circuit. It consists of a 35mm. color film, a 12-inch record, and a leader's guide containing suggested meeting procedures.

The film shows with simplified illustrations the internal construction and operation of a battery, distributor, and ignition coil, and explains in nontechnical terms how these units work together as a team to make up the ignition circuit in the modern automobile. Running time 12 minutes.

To accompany the film kit is a 20-page booklet in color, 6 by 9 in. in size, containing the same illustrations shown in the film. It may be used to review the film after it is shown.

The new film kit (DR-9020K) and film booklet (DR-9020) have been designed for use by students of auto mechanics, shop mechanics, or civic groups who wish to learn in simple nontechnical terms the basic function of the electrical units making up the ignition circuit.

Requests for the film or film booklets should be made to the technical editor, Delco-Remy Division, General Motors Corporation.

(For further details encircle index code 213)

NEW KODAK BOOKLETS

Eastman Kodak Company has introduced their booklet describing the varied uses of photocopying. This new 16-page illustrated booklet is entitled "Verifax Copying — Versatile Time-Saver for Busy Offices," and it presents in capsule case histories how companies from trucking firms to construction

contractors are saving time and money with modern office copying systems.

It is available without charge from Verifax dealers, or by writing Business Photo Methods Division, of Eastman Kodak Company.

Eastman Kodak Company also has prepared a new folder, "Kodak Materials for Overhead Projection," which describes the several simple photographic procedures by which transparencies can be prepared for use in overhead projectors. It is a four-page illustrated leaflet covering positive transparencies from line originals on translucent stock, positive transparencies from originals on opaque stock, negative transparencies, changing the size of an original subject, adding color to transparencies, and making duplicate slides.

"Kodak Materials for Overhead Projection" is punched to fit the Kodak Photographic Notebook, and is available free from the Sales Service Division, Eastman Kodak Company.

(For further details encircle index code 214)

VOLUME 7 OF "TUBE LOCATION GUIDE"

The Howard W. Sams & Co., Inc., have announced Volume 7 of the popular "Tube Location Guide" series. These guides show the chassis layout of television receivers, the types of tubes used, and the function of each tube. Also included with each diagram is a "Tube Failure Check Chart" which lists the tubes which are to be suspected when the indicated trouble is experienced.

Volume 7 gives complete coverage on 160 chassis (approximately 500 models) of television receivers produced in 1956 and 1957. This includes three new Color-TV chassis. A complete cumulative index lists all models covered in previous volumes as well as those presented in Volume 7.

Containing 204 pages, 5½ by 8½ in., Volume 7 of "Television Tube Location Guide" is sold through electronic parts distributors. It carries Catalog No. TGL-7, and sells for $2.

(For further details encircle index code 215)

NEW SERIES OF FILM STRIPS

Stanley Tools, division of The Stanley Works, have produced a new set of 35mm. black and white visual aid film strips covering the subject, "Boring Tools for Woodworking." The new series of nine film strips illustrates the different types and uses of boring tools such as hand drills, bit braces, bits for power tools, etc.

The films also cover the use of doweling jigs; automatic push drills, and spiral ratchet drivers when used for boring holes. Designed to augment teaching and demonstrations, the films were produced in sharp black and white, and are ideal for wall or screen projection in a semidarkened or ordinary lighted room, shop, or classroom.

All Stanley film strips can be rapidly viewed in working areas, allowing students to make quick studies and at the same time, practically apply the instructions at the workbench.

Previous series have covered: (1) Planes; (2) Measuring, Testing, and Marking Tools; (3) Chisels for Woodworking.

The new series contains: (A) Types of Boring Tools; (B) Holding and Boring Tools and Accessories; (C) How to Bore a Hole; (D) How to Use the Doweling Jig; (E) How to Use Expansive Bits, Forstner Bits, Brad Awls; (F) How to Use Hand and Breast Drills; (G) How to Use Automatic Push Drills and Spiral Ratchet Drivers to Bore Holes; (H) Boring Tools for Use in Electric Drills; (I) How to Sharpen Boring Tools.

Stanley offers the series at the cost of film, packaging and postage. Write to Stanley Tools, Educational Department.

(For further details encircle index code 216)

SAMS BOOKS are the most widely used publications for effective instruction in RADIO, TV, ELECTRONICS & ELECTRICITY

OVER 80 POPULAR TITLES AVAILABLE INCLUDING "BEST SELLERS" LIKE THESE...

LEARNING ELECTRICITY FUNDAMENTALS

This remarkably clear book covers the complete story of electricity: historical development; electron theory; static electricity; electrical fundamentals; types and uses of fuses and switches; electrical resistance; Ohm's Law; magnetism; electro-magnetism; work, energy and power; theory, construction and use of transformers; operation and applications of generators and motors (DC and AC); circuits and controls; practical wiring and electrical apparatus. A complete, authoritative, effective textbook. 480 pages; 5½ x 8½"; illustrated. Order *EFC-1*, only..... $5.95

BASIC ELECTRICITY MANUAL

Outstanding course in electricity, planned to achieve maximum teaching effectiveness. Consists of 36 Lessons in Practical Electricity, covering basic theory, laws, terms, magnetism, motors, transformers, lighting, telephones and dozens of other subjects. Includes 13-Projects Section, outlining simple, inexpensive projects which demonstrate theory in action in a practical, interesting way. 264 pages; profusely illustrated; 8½ x 11".
Order *ED-12*, only..... $5.00

BASIC RADIO MANUAL

Widely used comprehensive Training Course. Includes 36-Lesson Section covering basic radio theory, terms, circuits and symbols, components, test instruments, radio transmitting and receiving principles. The 13-Project Section demonstrates theory in action by practical doing; includes construction projects, application of basic laws, soldering practice, demonstration of components and construction. Adopted as standard text by hundreds of schools. Contains 248 pages; 8½ x 11"; fully illustrated.
Order *ED-1*, only..... $5.00

BASIC TELEVISION MANUAL

Invaluable training course for TV instruction. 24-Lesson Section covers oscilloscope principles and application; power supplies; FM carrier waves, discriminators, ratio detectors; antenna principles and design; TV receivers; RF amplifiers and tuners; Video IF, detector, AGC and sweep circuits; cathode ray picture tubes, etc. Project Section includes nine basic projects translating theory into actual practice and so designed as to sustain interest. This effective TV manual contains 280 pages; 7½ x 11"; fully illustrated.
Order *ED-21*, only..... $5.00

COLOR TV TRAINING MANUAL

For advanced students. Covers principles of the Color TV system, including colorimetry, make-up of the color signal; Color receiver circuits (chapters on every type of circuit used in the receiver); Color receiver servicing, including setting up the Color picture tube, alignment, trouble-shooting, test equipment required; also valuable appendices containing equations, vectors, color blocks and colorplates. A comprehensive Color TV training course. 260 pages; 8½ x 11"; profusely illustrated. Order *TVC-1*, only $6.95

PHOTOFACT TELEVISION COURSE

A complete, simple explanation of modern Television principles, operation and practice. Covers Cathode Beam Formation and Control; Beam Deflection Systems; Beam Modulation and Synchronization. Includes analysis of CR tube construction, camera tubes, voltage supplies, saw-tooth generators, sync circuits, control functions, receiving antenna circuits, RF input tuning systems, IF systems, AGC, etc. Fully illustrated; 208 pages; 8½ x 11".
Order *TV-1*, only..... $3.00

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INSTRUCTORS: Write today for complete list of all Sams publications. Ask also for PACKET ED-3 which contains valuable aids to instructors in Radio, TV, Electronics and Electricity. Includes Wall-size Schematic Diagrams and comprehensive Test Equipment data. FREE to instructors on request — write today.

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Shop Equipment News

"POWER SHOP" WHEEL TYPE STAND

DeWalt Division, American Machine and Foundry Company, has introduced a new wheel type steel stand for its MBF "Power Shop" multi-purpose machine.

A special feature of the new stand is its handy roll-away mobility made possible by two fixed rear wheels and an adjustable front wheel which can be raised or lowered for fixed or mobile use. Sturdy construction is assured by the use of four steel legs which can be easily attached to the recommended ¾-in. plywood shelves by eight support brackets. The "Power Shop" fits snugly in place on the top shelf, and is held fast by bolts which enter corresponding holes on the legs and machine base.

If the home craftsman has already housed the "Power Shop" in a workbench, the stand can easily be converted to a handy movable worktable by setting the support brackets, which hold the top shelf, at the uppermost position on the legs, thereby giving a flush working surface.

The new stand includes four steel legs, eight brackets, two fixed rear wheels, adjustable front wheel, and hardware.

(For further details encircle index code 201)

The New Wheel-Type Steel Stand for the MBF "Power Shop"

THIS BIG ILLUSTRATED

LEATHERCRAFT CATALOG

There is no finer source of materials for Leathercraft projects of all kinds . . . easy-to-assemble kits to enable beginners to make billfolds, gloves, purses, belts and other attractive items . . . top quality tooling and carving leathers for advanced craftsmen. Also complete line of Leathercraft tools, accessories, supplies and instruction books.

ATTENTION

METALCRAFT HOBBYISTS

Here is a comprehensive illustrated catalog from which you can make your selection of aluminum and copper in sheets and shapes for many projects; copper, aluminum and brass foil for metal tooling; kilns, colors and kits for metal enameling; instruction books, tools and accessories for metalcraft of all kinds.

SEND TODAY FOR EITHER OR BOTH FREE CATALOGS

J. C. LARSON CO.

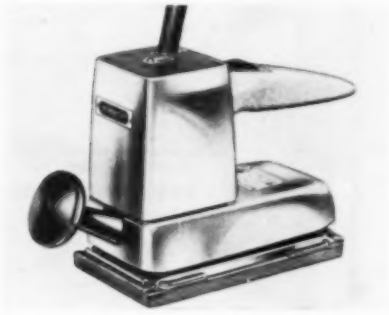
820 S. TRIPP AVE., DEPT. 7213
CHICAGO 24, ILLINOIS

NEW ORBITAL SANDERS

Stanley Electric Tools, division of The Stanley Works, have introduced a new orbital sander. This sander incorporates the most advanced engineering developments.

The sander will find wide application with teachers of industrial arts and vocational shop work, as well as students interested in cabinetmaking, boat building, and the like.

This sander features maximum operating efficiency with the no-slip gear tooth type driving belts and their Stanley-built air cooled motors, ball bearing construction, vertically positioned "out-of-the-way" cords and perfect balance.



Stanley Orbital Sander

The Stanley H36 orbital sander is a heavy-duty tool weighing 6½ lb., and is 11⅛ in. long, 3¾ in. wide, and 6⅜ in. high. Having a pad size of 7 1/16 by 3⅝ in., the sander makes 4500 orbits per minute. Orbit size is 3/16 in.

Stanley's 3-in., heavy-duty H31 belt sander has power and ventilating systems designed for maximum sanding power with continuously cool operation. The new sander weighs 15 lb., and is 13½ in. long, 6 in. wide, and 7½ in. high. Belt size is 3 by 24 in.

A "D" grip handle with trigger activator combines with a forward "T" shaped handle to give an operator perfect control of sanding operation.

Among the other outstanding features of this new belt is the quick changing of the abrasive belts which only takes a few seconds. There are no gears to be oiled.

Stanley Electric Tools are sold only by leading distributors.

(For further details encircle index code 202)

CORRESPONDING CODE INDEX NUMBERS TO BE ENCIRCLED CAN BE FOUND ON THE CARDS IN THE READER'S SERVICE SECTION

STARRETT HOOK TOOTH BAND SAW BLADE

The L. S. Starrett Company have introduced a new hard-edge, flexible-back band saw blade, with a positive rake *hook* teeth of improved design which cut with a smooth, clean shearing action that requires less feed pressure.

Starrett Hook Tooth Band Saw Blade

The teeth are scientifically designed for uniform stress distribution to permit heavier feeds for faster cutting. Rounded gullet construction insures more efficient chip flow and greater chip removel without clogging.

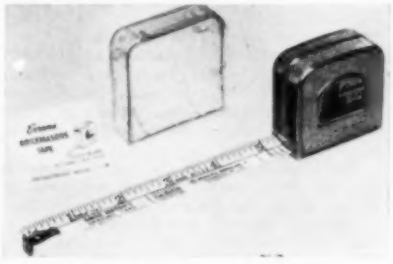
Recommended for fast, low-cost cutting of nonferrous metals, special compositions, fiber, Bakelite, plastics, wood and similar materials, this new hook tooth band saw is claimed to give faster production and longer blade life while producing a smoother finish. It is available through industrial supply distributors in individually boxed welded bands to fit any band saw machine and in 100, 250, or 500-foot coils in handy safety pull-out cartons.

Starrett Hacksaw and Band Saw Catalog is available on request.

(For further details encircle index code 203)

THE EVANS BRICKMASONS TAPE

The first steel tape specifically designed for brickmasons, both professional and do-it-yourselfers, has been introduced by Evans Rule Company, manufacturer of steel measuring tapes.



Evans Brickmasons Tape

Designed for complete ease in handling and measuring, Evans new brickmasons tape incorporates three scales on the same side of the blade. Therefore, the user can compare inch marking with the most suitable brick course without turning the blade over. He can also check the brick course being layed, and can actually do the complete job with just one tape. Clearly indicated in jet black markings on a snow-white blade are ten standard brick courses, regular inch graduations, plus the basic modular course flagged at eight-inch intervals. The sturdy die-cast case is chrome-plated with sure-grip knurled edge, and is equipped with a belt hook for easy carrying.

The Evans Brickmasons Tape is 6 ft. long, and comes in a transparent plastic bubble that protects the tape and serves as a handy container as well.

(For further details encircle index code 204)

ROTATING ELECTRIC MACHINERY EQUIPMENT

Crow rotating electric instruction equipment is now available in three different *visual experiment* models to meet the needs of every course.

Model 200 is a 119-piece unit for elementary courses. It provides a solid grasp of the a.c.-d.c. motors and generators most commonly used in household appliances and simple industrial machines.

Crow Rotating Electric Machinery Equipment

Model 250, for intermediate courses, permits a more intensive study of the machines covered by Model 200, plus a comparative analysis of concentrated and distributed windings.

Model 700 is the Comprehensive Crow unit for advanced courses. Its 241 parts constitute a complete Rotating Electric Machinery laboratory — all the apparatus needed to teach the theory, construction, and operation of almost every commercial motor and generator now in use.

Each model includes a work manual newly revised. These fully illustrated manuals give step-by-step directions for setting up each machine, then discuss the principles involved and their practical applications.

For details, prices, and specifications, write to Universal Scientific Company.

(For further details encircle index code 205)

MECHANICAL DRAWING EQUIPMENT

Brodhead-Garrett Company are promoting a special sale of their line of equipment for drafting classes. The list of items available at a discount include their fine WD-6 six-student drawing table, the WD1 and WD4 wooden drawing tables, the MD-4 four-student drawing table, Model MD-1 drawing table, Model WD-44 four-student drawing table, Model SA-21 new art table, WD-1 art and drawing table, and Model SA20 two-student drawing table, as well as other table models and storage equipment. In addition they are offering numerous items such as mechanical drawing instruments and tools, papers, pencils, scales, and tape, at special prices.

For further information write to the company.

(For further details encircle index code 206)

SPEEDMASTERS AND COPYMASTERS

P & H Sales Corporation have made available several models of whiteprinting machines for the ammonia-dry process of reproduction of papers at great savings in less time.

Speedmasters and Copymasters are machines of the latest design proved by widespread use. Thousands of installations throughout industry-government agencies, engineering offices, schools, etc., means that these machines are tried and true.

Models are offered to meet most production requirements. Speed ranges from 14 feet per minute to 40 feet per minute maximum are available in four Speedmaster models — 1400C; 1400CT; 2500C; and 4000C. Simplicity of design provides ease of operation and maintenance. Whether your need is for engineering prints or a modern office system copymaking machine; a "Masterline" unit is planned to do the best job possible. All models can be used for making blue, black, or maroon line paper prints and hundreds of other diazo sensitized products. Most models are for the dry-ammonia-vapor type due to the overwhelming preference for this process. One moist diazo process unit (1400CM) is offered.

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Venting of *both types* of machines is needed for heat removal.

Further information will be furnished upon request.

(For further details encircle index code 207)

MAGNETIC BASE TOOLS AND ACCESSORIES

A new high in convenience has been attained by the introduction of the time-saving line of Magnetic Base Tool combinations manufactured by the Brown & Sharpe Mfg. Company. Known as the Magnicator Junior, this versatile tool comes in two base sizes, with a variety of accessory dial indicators, lights, and magnifiers to meet multiple inspection and setup needs. The blue plastic

(Continued on next page)

FREE teaching aid

Helps students to learn the difference between minimum "Code" wiring and wiring that provides a home with full HOUSEPOWER. Simple, easy-to-understand; will encourage class discussion. The project has been specifically prepared by The National Adequate Wiring Bureau in response to requests by vocational teachers for material about adequate wiring.

ELECTRICAL PLANNING FOR TODAY'S HOMES is presented in the form of a series of true-false questions and answers. It interprets technical theory in terms of the householder's daily use of electricity, based on the standard contained in the Residential Wiring Handbook developed by the Industry Committee on Interior Wiring Design.

Send for this free teaching aid today.

National Wiring Bureau, 155 E. 44 Street, New York 17, N. Y.

Please send me free copy of teaching aid "Electrical Planning for Today's Homes."

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School_____

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INDUSTRIAL ARTS
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APRONS: APPROVED BY PARENTS
Dress your class in uniform protection.
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APRONS ARE A NECESSITY
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Full cut aprons, expertly constructed, 4 colors - 4 sizes. Plus BONUS APRONS. Details, material samples in Circular 29.

WRITE FOR CIRCULAR NO. 29

COATS: 2 Distinctive Styles Expertly tailored. Top quality material. Designed exclusively for the Industrial Arts Teacher. In 5 colors. Details, material samples in Circular 29.

"The School Apron Folks"

CAN-PRO Corporation
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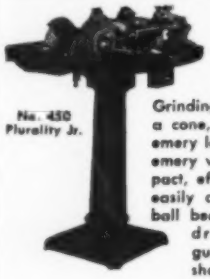
TOOLS ALWAYS SHARP WITH PLURALITY OILSTONE TOOL GRINDERS



NOW AVAILABLE IN 3 SIZES
No. 425 Plurality Sub Jr.
No. 430 Plurality Jr.
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No. 430 Plurality Jr.

Grinding can be done on a cone, coarse or fine or emery leather stropping or emery wheels. Unit is compact, efficient, serviceable, easily accessible and has ball bearing direct motor drive. Especially guarded for school shop use. Details on request.

MUMMERT-DIXON CO.
HANOVER, PENNSYLVANIA
Originators and Pioneer Manufacturers of Oilstone Tool Grinders

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Send 25c for Catalogue
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Prompt and Courteous Service
Discounts Available

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Ft. Worth, Texas

SHOP EQUIPMENT NEWS

(Continued from previous page)

The New Brown & Sharpe Magnicator Junior

permanent magnetic bases can be turned on and off with a flick of a fast-action cam release, and are provided with *keepers* to preserve their magnetic strength, which reaches 125 lb. holding power in the larger model. The small size, designed specifically for use in places inaccessible for larger indicators, can be mounted instantly and firmly on surfaces as small as ¾ in. in diameter. Combinations include 3-diameter dial holding rod, a swivel adapter for universal angular positioning, and a fine adjustment screw for zeroing indicators.

Spherically milled ball seats are positive locking, and the nonmagnetic tool post is brazed to the magnet assembly, assuring rigidity and insulating dial indicators from the base magnet.

(For further details encircle index code 208)

"PARAMOUNT" REFILL DRAWING LEADS

Alvin & Company is now offering a complete selection of "Paramount" refill drawing leads, available in 18 degrees of hardness from 7B to 9H. These top grade imported refill drawing leads are of superior quality and

"Paramount" Refill Drawing Leads

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LEATHER ALL KINDS

FROM AROUND THE WORLD

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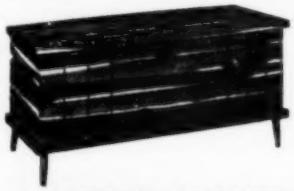

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drawing strength guaranteeing dense, uniform lines for perfect drawings and sharp blueprints without inking.

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Lead is packaged in convenient tubes, containing one dozen leads. Also available in boxes of 12 tubes.

(For further details encircle index code 209)

X-ACTO HANDY TYPOGRAPHY KNIFE

A handy, replaceable-blade knife made by X-acto, Inc., is proving a versatile and economical aid to typographers for removing excess lead flashing, burrs, and correcting minor errors on lead slugs.

X-acto Typography Knife

The sturdy razor-sharp surgical-steel blade, mounted in an easy-to-grip handle, is used to scrape away flashing, remove hairlines, dead metal and correct errors on the type face itself. Sharp blades of other shapes also permit precision cutting of larger type face for notching the slug to add rules for underscoring.

The X-acto knife is proving particularly valuable for speedy cleaning of dead metal and removing errors on Ludlow slugs. Refill blades, costing no more than a few pennies, may be changed in a matter of seconds.

Knives and blades are sold at hobby, hardware, and art supply stores.

(For further details encircle index code 210)

HIGH-FIDELITY TAPE RECORDER

Allied Radio Corporation announces the release of their new Model KN-4010 High Fidelity Tape Recorder. Push-button operated, this two-speed unit is ideally suited for school applications such as the recording and playback of lectures and speeches, and for use in speech, music, and drama classes.

The recorder includes a built-in 8-watt push-pull amplifier, two built-in speakers, and a "roving" speaker for added sound coverage in large rooms. The slow speed, 3¾ in. per second, provides up to 3 hours of recording on a single 7-in. (1800 ft.) reel of tape. The fast speed, 7½ in. per second, provides highest quality performance.

The push-button keyboard permits selection of record, playback, rewind, fast-forward, or stop at the touch of a finger. Other features of special interest include a new, transistorized preamplifier said to reduce hum and noise to a minimum; a digital index that

(Continued on next page)

CORRESPONDING CODE INDEX NUMBERS TO BE ENCIRCLED CAN BE FOUND ON THE CARDS IN THE READER'S SERVICE SECTION

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SHOP EQUIPMENT NEWS

(Continued from previous page)

High-Fidelity Tape Recorder

lets you "pin point" any specific portion of a tape; a highly efficient a.c. erase system; a safety lock that prevents accidental erasure; and an automatic shut-off which stops the recorder the instant a tape is finished.

The Knight KN-4010 is supplied with microphone, "roving" speaker, and a 5-in. reel of tape. It is listed under Allied Stock No. 91 RZ 750.

(For further details encircle index code 211)

CORRESPONDING CODE INDEX NUMBERS TO BE ENCIRCLED CAN BE FOUND ON THE CARDS IN THE READER'S SERVICE SECTION

There are 145 steelmaking plants in 28 states; 86 plants with blast furnaces in 18 states, 84 plants with hot rolled sheet or strip capacity, or both, in 18 states. — *Steel Facts.*

The United States as a nation in World War II conducted campaigns and conquered areas vaster in size and more widely dispersed than the conquests of any other nation in the world's history. — *Wisconsin Military District Public Information Office.*

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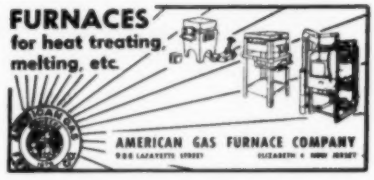

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READER'S SERVICE SECTION

INDEX TO SHOP EQUIPMENT

The index and digest of advertisements below are provided for your convenience in requesting free product information, catalogs and literature offered by the advertisers and the manufacturers listed in Shop Equipment News. To obtain this information or literature, encircle code numbers, sign the card, and mail. Your request will receive prompt attention.

Code No.		Page No.
20	**Adjustable Clamp Company**..... Jorgensen and pony clamps.	10A
21	**Allied Radio Corp., The**..... New dual-speed push-button automatic tape recorder.	15A
22	**Alvin & Company**..... Ready reference chart with decimal table.	30A
23	**American Gas Furnace Co**..... Heat treating equipment.	38A
24	**American Technical Society**..... Publishers.	22A
25	**Armstrong Bros. Tool Co**..... Tool holders.	15A
26	**Atlas Press Company, The**..... Clausing 13" lathe.	11A
27	**Bedford Lumber Co**..... Knockdown cedar chest and aromatic red cedar lumber.	36A
28	**Black and Decker Mfg. Co**..... Heavy duty router. Use coupon for literature and free demonstration.	5A
29	**Board of Examiners**..... Teaching positions.	38A
210	**Boice-Crane Company**..... Power tools. Use coupon p. 13A for catalog.	13A
211	**Brodhead-Garrett Company**..... Winners of lumber contest.	21A
212	**Bruce Publishing Company**..... Textbooks.	3rd cover
213	**Can-Pro Corporation**..... Shop aprons and coats.	36A
214	**Chilton Company**..... Automotive job sheets.	30A
215	**Cincinnati Tool Company, The**..... Complete line tested tools.	32A
216	**Constantine & Son, Inc., Albert**..... Woods, tools and materials.	36A
217	**Copper Shop, The**..... Enamel-on-copper idea book.	38A
218	**Craftsman Wood Service Co**..... Catalog of wood and woodworking equipment.	31A
219	**Crow Electri-Craft Corp. (Div. Univ. Scientific Corp.)**..... Teach electricity and electronics.	16A
220	**Delta Power Tool Div. Rockwell Mfg. Co**..... 12" wood lathe.	2A
221	**Designers Company**..... Castings for school projects.	36A
222	**Dick Company, A. B**..... Offset duplicator. Use coupon p. 23A for information.	23A
223	**Dietzgen Company, Eugene**..... Drafting, surveying and print-making supplies.	2nd cover
224	**DonJer Products**..... Free catalog on pre-tested new ideas for school shops.	38A
225	**Eastman Kodak Co**..... Sound projectors.	25A
226	**Electric Hotpack Company, Inc**..... Electric ceramic kilns.	32A
227	**Foley Lumber Company, T. A**..... Lumber.	38A
228	**Foley Manufacturing Co**..... New grinder. Use coupon p. 14A for information.	14A
229	**Formit**..... Tools and materials for making hand wrought iron work.	30A
230	**General Finishes Sales & Service Co.** Wood finishing with Sealacell process.	37A
231	**General Scientific Co**..... Safety goggles.	30A
232	**Gilbert & Miller, Inc**..... New catalog for project activities.	38A
233	**Giles and Kendall Co**..... Knockdown cedar chest and aromatic red cedar lumber.	37A
234	**Greenlee Tool Co**..... Auger bits, chisels, gouges.	13A
235	**Hammett Company, J. L**..... Handicraft supplies. Free catalog.	38A
236	**Hardwood Corp. of America**..... Lumber for schools.	22A
237	**Hays Hardwood Lumber Co**..... Domestic and foreign shop and furniture lumber.	36A
238	**Humanics Institute**..... Investment opportunity.	38A
239	**Irwin Auger Bit Co**..... Wood boring tools.	14A
240	**Kalamazoo Tank & Silo Co**..... Metal cutting band saw.	10A
241	**Kassel & Co., L. H**..... Lamp parts and electrical supplies.	36A
242	**Kester Solder Company**..... Flux core solder.	32A
243	**Larson Co., J. C**..... Leathercraft catalog.	34A
244	**LeBlond Machine Tool Co., R. K.** Regal lathes.	4th cover
245	**Logan Engineering Company**..... Lathes.	7A
246	**Mayline Co**..... Drafting and art supplies.	16A

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INDUSTRIAL ARTS AND VOCATIONAL EDUCATION — February, 1958
400 North Broadway, Milwaukee 1, Wisconsin

Please ask the manufacturers, whose code numbers I have encircled, to send me the information, catalogs, or product literature offered in this issue.

ADVERTISING INDEX

20	26	212	218	224	230	235	240	245	250	255	260	265	270	275	280
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NEWS OF PRODUCTS FOR THE SCHOOLS

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READER'S SERVICE SECTION

(Continued)

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248	**Millers Falls Company**..... New line full-power saws.	24A
249	**Mittermeier, Frank**..... Imported carving tools and hobbycraft sets.	38A
250	**Morgan Vise Company**..... Vises. Write for catalog.	12A
251	**Mummert-Dixon Company**..... Oilstone tool grinders.	36A
252	**National Wiring Bureau**..... Teaching aid "Electrical planning for Today's Homes." Use coupon for free copy.	35A
253	**Oliver Machinery Co.**..... 18" planer for surfacing small stock.	13A
254	**O'Neil Irwin Mfg. Company**..... 38 live ideas for the metal and general shop instructor. Use coupon page 28A.	28A
255	**Parent Metal Products, Inc.**..... Answer to tool storage problems.	27A
256	**Parks Woodworking Machine Co.**..... Planers.	15A
257	**Patterson Bros.**..... Wood and metal shop supplies.	38A
258	**Pine Forest Camp**..... Maintenance man for children's co-ed camp.	38A
259	**Pittsburgh Plate Glass Co.**..... Color dynamics.	17A
260	**Post Company, Frederick**..... Drafting supplies.	8A
261	**Powermatic Machine Co.**..... Band saws. Use coupon 14A for details.	14A
262	**Sams & Co., Inc., Howard W.**..... Books for instruction in radio, TV, Electronics and electricity.	33A
263	**Saxcrafts, Div. of Sax Brothers, Inc.** Craft supplies. Free catalog.	38A
264	**School Products Co.**..... Craft and art supplies catalog free.	38A
265	**Seeley's Ceramic Studio**..... Complete ceramic service.	38A
266	**Sheldon Machine Co., Inc.**..... Precision lathes.	4A
267	**Simonds Saw & Steel Co.**..... Si-clone saws.	20A
268	**Snap-on Tools Corporation**..... Snap-on tools. Ask for helpful wall chart.	10A
269	**South Bend Lathe Works**..... Lathes, shapers, milling machines. Use coupon page 1A for information.	1A
270	**Standard Pressed Steel Co.**..... Mechanical drawing and art class furniture.	19A
271	**Stark Lumber Co., Inc., W. P.**..... Lumber and plywood.	37A
272	**Starrett Co., The L. S.**..... Precision tools.	6A
273	**Sterling Wheelbarrow Co.**..... Steel flasks.	27A
274	**Stoner Wood Products Co.**..... Shop furniture.	37A
275	**Stueck, Inc., W. Whitney**..... Universal bench brake.	16A
276	**Tandy Leather Company**..... Leather of all kinds.	36A
277	**Thompson Corp., Geo. S.**..... Student and instructor contest. Write for details.	37A
278	**Universal Drafting Machine Corporation, The**..... Drafting machines.	27A
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280	**Walker-Turner Div. Rockwell Mfg. Co.** Light-heavyweight machine tools.	18A
281	**Webcraft, Inc.**..... Colorful webbing. Send for swatch books and list of webbed furniture patterns.	31A
282	**Weber Company, F.**..... Drawing materials and instruments.	36A
283	**Wilton Tool Mfg. Co.**..... Machinist vises.	9A
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SHOP EQUIPMENT NEWS

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203	**L. S. Starrett Co.**..... Hook Tooth Band Saw Blade	34A
204	**Evans Rule Co.**..... Evans Brickmasons Tape	34A
205	**Universal Scientific Co.**..... Crow Rotating Electric Machinery Equipment	35A
206	**Brodhead-Garrett Co.**..... Mechanical Drawing Equipment	35A
207	**P & H Sales Corp.**..... Speedmasters and Copymasters	35A
208	**Brown & Sharpe Mfg. Co.**..... Magnetic Base Tools and Accessories	35A
209	**Alvin & Co.**..... "Paramount" Refill Drawing Leads	36A
210	**X-acto, Inc.**..... X-acto Typography Knife	37A
211	**Allied Radio Corp.**..... High-Fidelity Tape Recorder	37A
212	**Burstein-Applebee Co.**..... Catalog	32A
213	**Delco-Remy Div., General Motors Corp.**..... Slide-Sound, Color Film Kit	32A
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